Nortel Secure Router 4134

Installation — Hardware Components

Release: 10.1
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Sourced in Canada, the United States of America, and India.

ATTENTION: Before unpacking, installing, or using the Secure Router 4134, ensure you read the section about regulatory information and general safety precautions in the first chapter of this guide.

Contents

Secure Router 4134 regulatory information and safety precautions

International Regulatory Statements of Conformity

This is to certify that the Nortel Secure Router 4134 equipment was evaluated to the international regulatory standards for electromagnetic compliance (EMC) and safety and were found to have met the requirements for the following international standards:

- EMC – Electromagnetic Emissions – CISPR 22, Class A
- EMC – Electromagnetic Immunity – CISPR 24
- Electrical Safety – IEC 60950, with CB member national deviations

Further, the equipment has been certified as compliant with the national standards as detailed below.

National Electromagnetic Compliance (EMC) Statements of Compliance

FCC statement (USA only)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures may be necessary to correct the interference at their own expense. Changes or modifications not expressly approved by Nortel could void the user's authority to operate the equipment.

TIA-968-A

This equipment complies with Part 68 of the FCC rules. The FCC Part 68 label is located on the bottom chassis panel. This label contains the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be provided to your telephone company.

Connection to the telephone network should be made by using standard modular telephone jacks, type RJ-48C. The RJ-48C plug and/or jacks used must comply with the FCC Part 68 rules.

MFRs Port Identifier	Facilities Interface Code	Service Order Code	Network Connectors
T1: lines 1–16	04DU9-1SN 04DU9-1ZN	6.0N	RJ-48C

ICES statement (Canada only)

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (Nortel Secure Router 4134) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (le commutateur Nortel Secure Router 4134) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

CE marking statement (Europe only)

EN 55022 statements

This is to certify that the Nortel Secure Router 4134 equipment is shielded against the generation of radio interference in accordance with the application of Council Directive 2004/108/EC. Conformity is declared by the application of EN 55022 Class A (CISPR 22).

CAUTION
This device is a Class A product. In a domestic environment, this device can cause radio interference, in which case the user may be required to take appropriate measures. For translations of this message, see "Translations of safety messages" (page 117).

EN 55024 statement

This is to certify that the Nortel Secure Router 4134 is shielded against the susceptibility to radio interference in accordance with the application of Council Directive 2004/108/EC. Conformity is declared by the application of EN 55024 (CISPR 24).

EN 300386 statement

The Nortel Secure Router 4134 complies with the requirements of EN 300386 V1.3.3 for emissions and for immunity for a Class A device intended for use in either Telecommunications centre or locations other than telecommunications centres given the performance criteria as specified by the manufacturer.

European Union and European Free Trade Association (EFTA) notice

CE	All products labeled with the CE marking comply with R & TTE Directive (1999/5/EEC) which includes the Electromagnetic Compliance (EMC) Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (ENs). The equivalent international standards are listed in parenthesis.

- EN 55022 (CISPR 22)–Electromagnetic Interference
- EN 55024 (IEC 61000-4-2, -3, -4, -5, -6, -8, -11)–Electromagnetic Immunity
- EN 61000-3-2 (IEC 610000-3-2)–Power Line Harmonics
- EN 61000-3-3 (IEC 610000-3-3)–Power Line Flicker

VCCI statement (Japan/Nippon only)

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used in a domestic environment, radio disturbance

may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI statement (Taiwan only)

This is a Class A product based on the standard of the Bureau of Standards, Metrology and Inspection (BSMI) CNS 13438 and CNS14336, Class A.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

MIC notice (Republic of Korea only)

This device has been approved for use in Business applications only per the Class A requirements of the Republic of Korea Ministry of Information and Communications (MIC). This device may not be sold for use in a non-business application.

Observe the Regulatory Marking label on the back or bottom of each switch for specific certification information pertaining to this model. Each Nortel Secure Router 4134 model is approved for shipment to/usage in Korea and is labeled as such, with all appropriate text and the appropriate MIC reference number.

National Safety Statements of Compliance

EN 60950 statement

This is to certify that the Nortel Secure Router 4134 equipment is in compliance with the requirements of EN 60950 in accordance with the Low Voltage Directive. Additional national differences for all European Union countries have been evaluated for compliance.

NOM statement (Mexico only)

The following information is provided on the devices described in this document in compliance with the safety requirements of the Norma Oficial Méxicana (NOM):

Exporter:	Nortel Networks, 5400 Hellyer Ave, San Jose, CA 95138 USA.
Importer:	Nortel Networks de México, S.A. de C.V. Avenida Insurgentes Sur #1605 Piso 30, Oficina Col. San Jose Insurgentes Deleg-Benito Juarez México D.F. 03900
Tel: Fax:	52 5 480 2100 52 5 480 2199
Input:	Nortel Secure Router 4134: • PS-SR4K-660W-AC-POE 100-240V ~ 10A/5A 50/60 Hz • PS-SR4K-250W-AC 100-240V ~ 5A/3A 50/60 Hz • PS-SR4K-250W-DC 43-72V 9.5A MAX

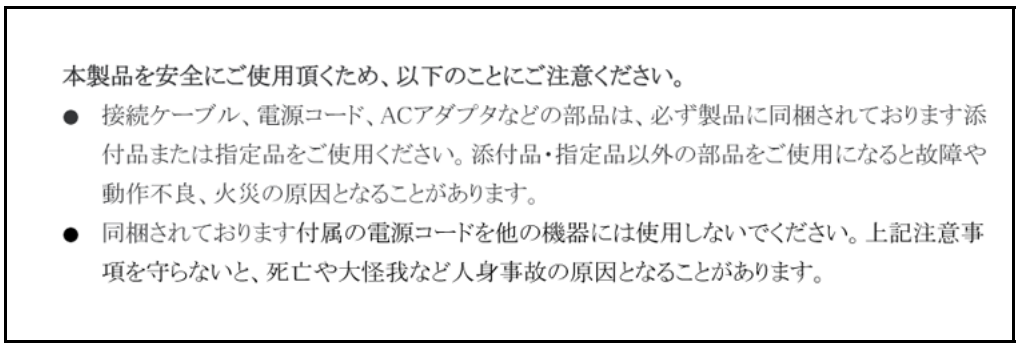
Información NOM (unicamente para México)

La información siguiente se proporciona en el dispositivo o en los dispositivos descritos en este documento, en cumplimiento con los requisitos de la Norma Oficial Méxicana (NOM):

Exportador:	Nortel Networks, 5400 Hellyer Ave, San Jose, CA 95138 USA.
Importador:	Nortel Networks de México, S.A. de C.V. Avenida Insurgentes Sur #1605 Piso 30, Oficina Col. San Jose Insurgentes Deleg-Benito Juarez México D.F. 03900

Tel: Fax:	52 5 480 2100 52 5 480 2199
Embarcar a:	Nortel Secure Router 4134: • PS-SR4K-660W-AC-POE 100-240V ~ 10A/5A 50/60 Hz • PS-SR4K-250W-AC 100-240V ~ 5A/3A 50/60 Hz • PS-SR4K-250W-DC 43-72V 9.5A MAX

Denan statement (Japan/Nippon only)


本製品を安全にご使用頂くため、以下のことにご注意ください。

- 接続ケーブル、電源コード、ACアダプタなどの部品は、必ず製品に同梱されております添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。
- 同梱されております付属の電源コードを他の機器には使用しないでください。上記注意事項を守らないと、死亡や大怪我など人身事故の原因となることがあります。

National Environmental Statements of Compliance

The WEEE Directive 2002/96/EC and RoHS (Restriction of Hazardous Substances) Directive 2002/95/EC sets collection, recycling and recovery targets for various categories of electrical products and their waste.

RoHS Directive Compliance Statement

The Restriction on Hazardous Substances Directive (RoHS) (2002/95/EC), which accompanies the WEEE Directive, bans the use of heavy metals and brominated flame-retardants in the manufacture of electrical and electronic equipment. Specifically, restricted materials under the RoHS Directive are Lead (including solder used in PCB's), Cadmium, Mercury, Hexavalent Chromium, and Bromine.

Nortel declares compliance with the European Union (EU) RoHS Directive (2002/95/EC).

WEEE Directive Compliance Statement

	This product at end of life is subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore is marked with the symbol shown at the left. Treatment applied at end of life of these products in these countries shall comply with the applicable national laws implementing Directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE). Nortel declares compliance with the European Union (EU) WEEE Directive (2002/96/EC).

Safety messages

This section describes the precautionary notices you find in this document. This section also contains precautionary notices that you must read for safe operation of the Nortel Secure Router 4134 and safe operation.

Notices

Notice paragraphs alert you about issues that require your attention. The following paragraphs describe the types of notices used in this guide. For translations of safety messages, see "Translations of safety messages" (page 117).

ATTENTION
An attention notice provides important information regarding the installation and operation of Nortel products.

CAUTION
ESD
ESD notices provide information about how to avoid discharge of static electricity and subsequent damage to Nortel products.

CAUTION
Caution notices provide information about how to avoid possible service disruption or damage to Nortel products.

WARNING
Warning notices provide information about how to avoid personal injury when working with Nortel products.

DANGER
Danger—High Voltage notices provide information about how to avoid a situation or condition that can cause serious personal injury or death from high voltage or electric shock.

DANGER
Danger notices provide information about how to avoid a situation or condition that can cause serious personal injury or death.

Cautions and warnings for the Secure Router 4134

The following precautionary messages apply to the Secure Router 4134. For your safety, read these precautions carefully before proceeding with installation of the product.

WARNING
Only qualified service personnel must perform the installation. Read and follow all warning notices and instructions marked on the product or included in the documentation. For translations of this message, see “Translations of safety messages” (page 117).

WARNING
This product relies on the building installation for overcurrent protection. Ensure that a fuse or circuit breaker no larger than 120 V AC, 15 A U.S. (240 V AC, 10 A international) is used on the phase conductors. For translations of this message, see “Translations of safety messages” (page 117).

CAUTION
To reduce the risk of fire, use only number 26 AWG or larger UL Listed or CSA Certified Telecommunication Line Cord for all network connections.

CAUTION
Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Hardware Notice

The Lithium battery in this product is part of a non-volatile memory device and will retain data for 10 years in the absence of power. Nortel does not consider the lithium battery in this unit a field replaceable or serviceable part and should not be accessed by the customer.

DANGER

Risk of injury by electric shock

Before working on this equipment, be aware of good safety practices and the hazards involved with electrical circuits. Use only power cords that have a grounding path. Ensure the switch is properly grounded before powering on the unit.

WARNING

Risk of eye injury by laser

Fiber optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a light source.

CAUTION

If you do not install interface modules in slots, keep the metal cover plates in place over the slots. Removing the cover plates impedes airflow and proper cooling of the unit. For translations of this message, see "Translations of safety messages" (page 117).

Foreign Exchange Station (FXS) Interface Modules

ATTENTION

Ensure you use standard straight-through RJ11 modular telephone cables with FXS interface modules. TIP must connect to TIP and RING must connect to RING. FXS ground start does not work if polarity is reversed.

ATTENTION

Nortel does not support FXS port connections leaving the building. Use FXS connections for intra-building purposes only.

WARNING

The 2- and 4-port FXS interface modules have a ring signal generator that is a source of hazardous voltage. Do not touch the RJ11 port conductors, the conductors of a cable (that is, the exposed metal ends of a cable connector) connected to the RJ11 port, or the circuit board when the ringer is active (an incoming call activates the ringer).

Foreign Exchange Office (FXO) Interface Modules

ATTENTION
Ensure you use standard straight-through RJ11 modular telephone cables with FXO interface modules. TIP must connect to TIP and RING must connect to RING.

ATTENTION
For connections that pass outside the building in which the Secure Router 4134 resides, you must connect FXO ports through an approved network termination unit that has integrated circuit protection.

WARNING
The 2- and 4-port FXO interface modules have a ring signal generator that is a source of hazardous voltage. Do not touch the RJ11 port conductors, the conductors of a cable (that is, the exposed metal ends of a cable connector) connected to the RJ11 port, or the circuit board when the ringer is active (an incoming call activates the ringer).

Personal safety and equipment protection

Read this section to prevent injury and equipment damage.

Module protection

The following practices prevent equipment damage when you work on the Nortel Secure Router 4134:

- Always wear a grounded antistatic wrist strap when you handle modules.
- Always set modules on appropriate antistatic material.
- Handle modules by the faceplate and handles. Do not touch pins or electrical connections.
- Do not leave interface module or power supply module slots empty. You must fill all slots with modules or slot covers to maintain safety compliance, proper cooling, and electromagnetic interference (EMI) containment in the shelf.
- Ensure that your environment meets the requirements for temperature, humidity, and cleanliness. See “Environmental requirements” (page 91).
- Do not overtighten thumb screws or lug nuts. Tighten screws and nuts until they are snug, plus a quarter turn. If you use a power tool to tighten screws, use a low torque setting of 2 to 3 in–lb (0.226 to 0.339 N-m).

Cables and connectors protection

The following practices prevent damage to cables and connectors:

- Use caution when connecting cables. Take care to ensure you insert each cable connector in the correct port for the purpose you intend. For example, ensure you connect LAN cables and connectors to LAN ports on the Secure Router 4134.
- Support cables to prevent stress on the connectors. If you have a high-density cable configuration, use an appropriate cable management system to relieve stress on the cables. Also ensure that cables are threaded neatly, and that you employ cable ties as required.
- Do not exceed the bend radius recommended for the type of cable installed.
- Fiber-optic cables and connectors require special care:
  - Cover connectors with rubber safety plugs when they are not connected.
  - Before you install or replace fiber-optic cables, clean the connectors.
  - Do not exceed the bend radius that is recommended for fiber-optic cable. The acceptable bend radius for fiber-optic cable is ten times its diameter, or 2.5 to 5 cm (1 to 2 in.). If you use a radius of less than the recommended bend radius, a loss of signal integrity can result. Loss of signal integrity caused by incorrect bend radius is difficult to diagnose.

Electrostatic discharge

Electrostatic discharge (ESD) is the transfer of charge between objects at different electrical potentials. ESD can change the electrical characteristics of a semiconductor device, and degrade or destroy it. ESD can cause equipment to malfunction or fail.

To dissipate or neutralize electrostatic charges, use proper grounding and use conductive or dissipative materials.

Use a grounded ESD wrist strap. When you use a wrist strap, any charge in your body can go to ground rather than damage a hardware module.

When shipping the product, proper antistatic packaging shields the product from charge caused by movement of the product within the shipping container.

Antistatic material

Antistatic material prevents electrical damage to equipment and therefore prevents the interruption of normal operations in an electronic system.

Place modules on an appropriate antistatic material when you replace hardware.

Use an ESD pad or antistatic packaging.

ATTENTION
Some antistatic packaging is effective only on the inside of the package.

New in this release

The following section details what's new in *Nortel Secure Router 4134 Installation — Hardware Components* for Release 10.1.

Features

See the following sections for information about feature changes:

- "Interface modules" (page 19)

Interface modules

Secure Router 4134, Release 10.1, introduces six new external interface modules:

- 2-port FXS Small Module
- 4-port FXS Small Module
- 2-port FXO Small Module
- 4-port FXO Small Module
- Voice Carrier Medium Module
- Mediation Server Module

For information about the new interface modules, see "Interface modules for the Secure Router 4134" (page 26).

Release 10.1 introduces a new internal module, the Packetized Voice Module (PVM), which provides support for voice functionality. For information about the PVM, see "Internal hardware components" (page 51). To install the PVM, see "Installing the internal PVM" (page 77).

Introduction

This installation guide provides basic instruction on how to install and replace the hardware components for the Secure Router 4134.

Prerequisites

- The installation of the Secure Router 4134 in the equipment rack is complete.

Navigation

- "Nortel Secure Router 4134 hardware components fundamentals" (page 23)
- "Installing Secure Router 4134 hardware components" (page 57)
- "Environmental requirements" (page 91)
- "Interface connector pin assignments" (page 93)
- "Serial cable descriptions" (page 101)
- "Translations of safety messages" (page 117)

Nortel Secure Router 4134 hardware components fundamentals

This section provides an overview of the Nortel Secure Router 4134 hardware components.

For information about installing the Secure Router 4134 chassis, see *Nortel Secure Router 4134 Installation — Chassis* (NN47263-300).

For information about initial configuration of the Secure Router 4134, see *Nortel Secure Router 4134 Commissioning* (NN47263-302).

Navigation

Power supply units

The Secure Router 4134 offers flexible power supply options. Power supplies are available in the following wattage:

- 250 W AC
- 660 W AC (410 W available for PoE)
- 250 W DC

The Secure Router 4134 has two slots for power supply units. You can install single or dual power supply modules in any of the following configurations:

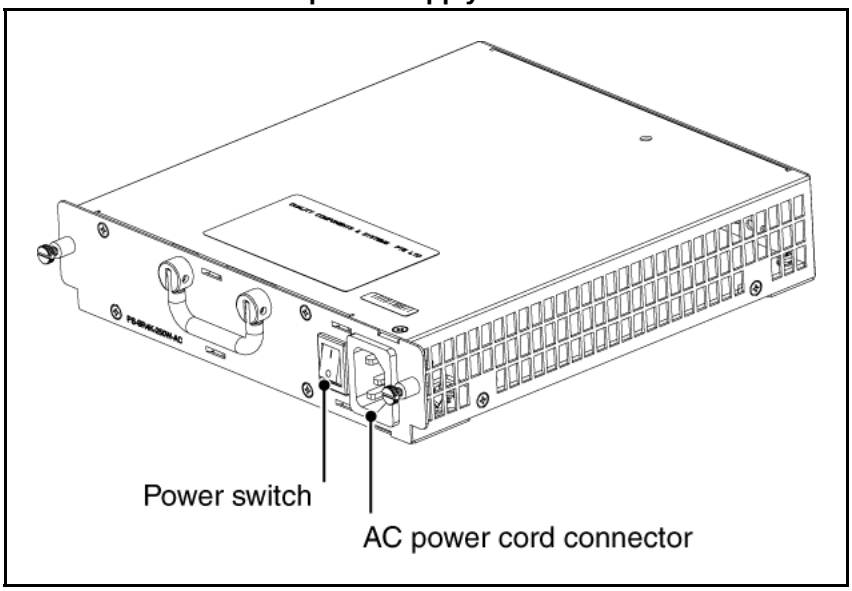
- one or two standard AC input modules
- one or two Power over Ethernet (PoE) AC input modules

- one standard AC and one PoE AC input module
- one or two DC modules
- one AC (standard or PoE) and one DC module

CAUTION
As a general safety precaution, be sure to provide DC power through a circuit breaker on the equipment rack.

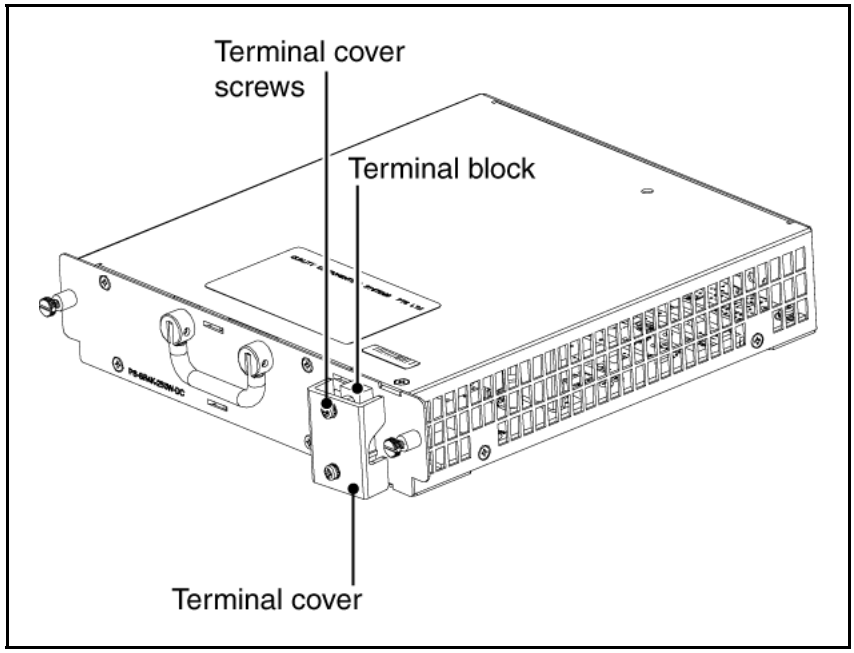
The following figure shows the AC power supply module for the Secure Router 4134.

Figure 1
Secure Router 4134 AC power supply module



The following figure shows the DC power supply module for the Secure Router 4134.

Figure 2
Secure Router 4134 DC power supply module



Fan tray

The Secure Router 4134 has four fans in the fan tray assembly.

The Secure Router 4134 checks the fan tray for faults every 15 seconds, and checks the temperature in the chassis every 2 minutes. The fan speed adjusts based on the chassis temperature. The following table shows the relationship between chassis temperature and fan speed.

Table 1
Chassis temperature and fan speed

Status	Temperature	Fan speed
Normal	Less than 61 degrees Celsius (141.8 degrees Fahrenheit)	39%
Critical	Greater or equivalent to 61 degrees Celsius (141.8 degrees Fahrenheit)	90%
Fault	Greater or equivalent to 71 degrees Celsius (159.8 degrees Fahrenheit)	100%

ATTENTION
While the system power is on, fans in the fan tray never completely stop rotating.

You can access the fan tray from the rear panel of the Secure Router 4134. The following figure shows the location of the fan tray in the chassis, and indicates air flow through the chassis.

The Secure Router 4134 ships with the fan tray installed.

CAUTION
Risk of equipment damage
The fan is essential for maintaining optimal system operating temperature. If you plan to replace the fan tray while the system power is on, ensure you have another fan tray ready to insert immediately. Watch the fan status LED for alerts.

Interface modules for the Secure Router 4134

For detailed information about the Secure Router 4134 interface modules, the supported features and functions of each module, and instructions for configuring features, see the following books:

- *Nortel Secure Router 4134 Configuration — SIP Media Gateway* (NN47263-508)
- *Nortel Secure Router 4134 Configuration — WAN interfaces* (NN47263-500)
- *Nortel Secure Router 4134 Configuration — Layer 2 Ethernet* (NN47263-501)

Nortel provides the following optional interface modules for the Secure Router 4134:

- Small Modules:
  - 1-port T1/E1 Small Module
  - 2-port T1/E1 Small Module
  - 2-port ISDN BRI ST Small Module
  - 2-port ISDN BRI U Small Module
  - 1-port Serial Small Module
  - 2-port Serial Small Module
  - 2-port Foreign Exchange Station (FXS) Small Module
  - 4-port FXS Small Module
  - 2-port Foreign Exchange Office (FXO) Small Module
  - 4-port FXO Small Module
- Medium Modules:

- 1-port HSSI Medium Module
- 1-port CT3 Medium Module
- 1-port DS3 Medium Module
- 8-port T1/E1 Medium Module
- 10-port Gigabit Ethernet (GbE) Medium Module
- 24-port Fast Ethernet (FE) Medium Module
- 24-port Fast Ethernet/Power over Ethernet (FE/PoE) Medium Module
- Voice Carrier Medium Module
- Mediation Server Module for Office Communications Server (OCS)

• Large Module:

- 44-port GbE Large Module

T1/E1 Small Module

Nortel offers the T1/E1 Small Module with one or two ports. The T1/E1 Small Module provides Wide Area Network (WAN) access through each of its T1/E1 ports.

You can install the 1- and 2-port T1/E1 Small Modules in any of the Small Module slots on the Secure Router 4134 chassis.

You can use the T1/E1 Small Modules for either data or voice connections. You can configure each port on the 2-port T1/E1 Small Module in either data or voice mode.

ATTENTION

Slot 2 of the Secure Router 4134 supports only one port of any WAN data Small Module. If you install a 2-port Small Module in Slot 2, and use the Small Module for data connections, one port only is functional (port 1).

This limitation also applies to the 2-port T1/E1 and ISDN BRI Small Modules if they are configured for voice traffic: only port 2/1 is functional. This limitation does not apply to FXS or FXO voice modules.

The following figures show the two types of T1/E1 Small Modules.

Figure 3
1-port T1/E1 Small Module

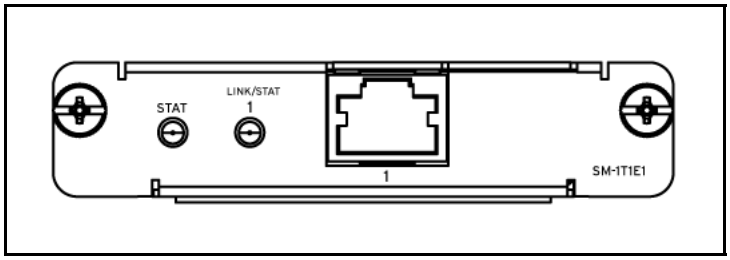
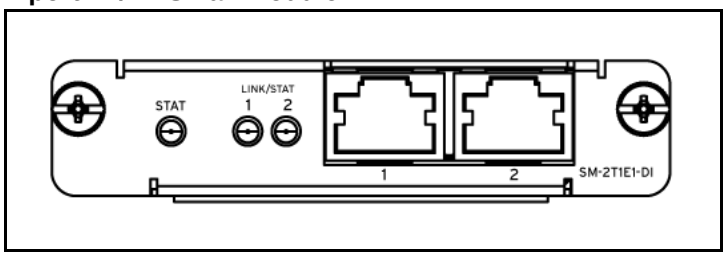


Figure 4
2-port T1/E1 Small Module



In data mode, the 1-port T1/E1 Small Module provides either one T1 port (supports 24 timeslots with a line data rate of 1.544 Mbps) or one E1 port (supports 31 timeslots with a line data rate of 2.048 Mbps).

In voice mode, the T1/E1 Small Module supports Channel Associated Signaling (CAS) to provide the Secure Router 4134 with connections to the Public Switched Telephone Network (PSTN). The T1/E1 Small Module supports CAS only when you configure the module for T1 connections. The Secure Router 4134 does not support E1 CAS.

You can also configure the 1- and 2-port T1/E1 Small Modules to operate as Integrated Services Digital Network (ISDN) primary rate interface (PRI) connections, providing 23 (T1) or 30 (E1) bearer channels (B-channel) for data and 1 D-channel for signaling. The Secure Router 4134 supports ISDN PRI for voice on T1 connections only (23 B-channels and 1 D-channel for signaling).

The 2-port T1/E1 Small Module provides either two T1 ports or two E1 ports.

Table 2
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
T1/E1	RJ45	T1: Dual twisted pair, 100 ohm, CAT3 or better E1: Dual shielded twisted pair, 120 ohms, or dual 75 ohm coax cables	None	T1: DSX1 (interior) from 0 to 655 ft. DS1 (exterior) from 0 to approximately 15 000 ft.

Table 3
Module LEDs

LED	Description
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational.
LINK/STAT 1	Status of interface 1: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
LINK/STAT 2 (applicable to 2-port module only)	Status of interface 2: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal

ISDN BRI S/T and ISDN BRI U Small Modules

You can use the ISDN BRI modules to provide backup network connectivity if the primary interface fails. The Dial-on-Demand Routing (DDR) feature on the ISDN BRI Small Modules enables you to configure the ISDN interface as a backup interface.

You can use the ISDN BRI U module at either the Line Termination (LT) end (that is, the Central Office) or Network Termination (NT) end (that is, Customer Premises) of a two-wire, long-haul connection to the PSTN.

You can use the ISDN BRI U Small Modules for either data or voice connections. You can configure each port on the 2-port ISDN BRI U Small Module in either data or voice mode.

The ISDN BRI U module provides two ISDN BRI U interface ports, each supporting two data timeslots. The ISDN BRI U interface provides a data bandwidth of 128 Kbps (two 64 Kbps B-channels), and a 16 Kbps management channel (d-channel).

For voice connections, each ISDN BRI U interface provides two B-channels for voice traffic and one D-channel for signaling.

You can use the ISDN BRI S/T Small Module only at the user end (Terminal Equipment [TE]) of a point-to-point S/T, four-wire, interior S or T link. You cannot use the ISDN BRI S/T module as the NT end of an S/T link, or in passive bus or star applications. Terminating resistors are fixed on the module and cannot be removed.

You can use the ISDN BRI S/T Small Modules for either data or voice connections. You can configure each port on the 2-port ISDN BRI S/T Small Module in either data or voice mode.

The ISDN BRI S/T module provides two ISDN BRI S/T interface ports, each supporting two data timeslots. The ISDN BRI S/T interface provides a data bandwidth of 128 Kbps (two 64 Kbps B-channels), and a 16 Kbps management channel (d-channel).

For voice connections, each ISDN BRI S/T interface provides two B-channels for voice traffic and one D-channel for signaling.

You can install the 2-port ISDN BRI Small Modules in any of the Small Module slots on the Secure Router 4134 chassis.

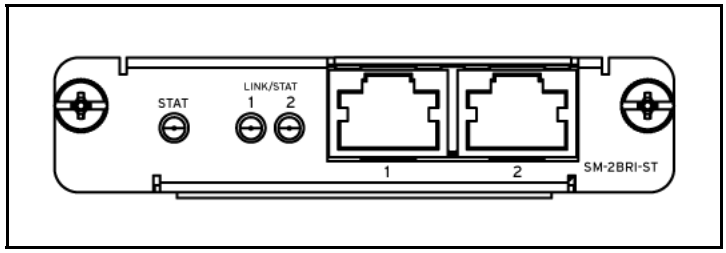
ATTENTION

Slot 2 of the Secure Router 4134 supports only one port of any WAN data Small Module. If you install a 2-port Small Module in Slot 2, and use the Small Module for data connections, one port only is functional (port 1).

This limitation also applies to the 2-port T1/E1 and ISDN BRI Small Modules if they are configured for voice traffic: only port 2/1 is functional. This limitation does not apply to FXS or FXO voice modules.

The following figure shows the 2-port ISDN BRI S/T Small Module.

Figure 5
2-port ISDN BRI S/T Small Module



The following figure shows the 2-port ISDN BRI U Small Module.

Figure 6
2-port ISDN BRI U Small Module

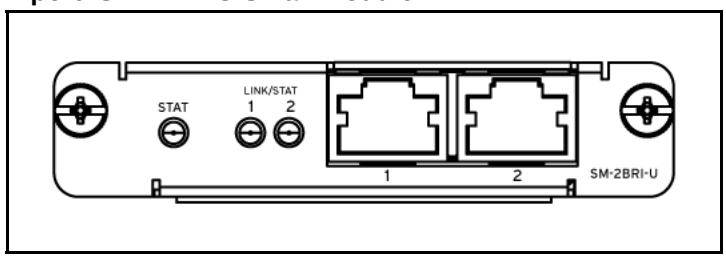


Table 4
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
BRI S/T or U	RJ45	BRI S/T: Two 75 to 150 ohm balanced twisted pairs (CAT-3) BRI U: One twisted pair—unloaded CAT-3 loops	None	BRI S/T: Up to 1 Km = 3 300 ft (interior) BRI U: Up to 18 000 ft = 5.5 Km

Table 5
Module LEDs

LED	Description
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational.

Table 5
Module LEDs (cont'd.)

LED	Description
LINK/STAT 1	Status of interface 1: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
LINK/STAT 2	Status of interface 1: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal

Serial Small Module

You can install the 1- and 2-port Serial Small Modules in any of the Small Module slots on the Secure Router 4134 chassis.

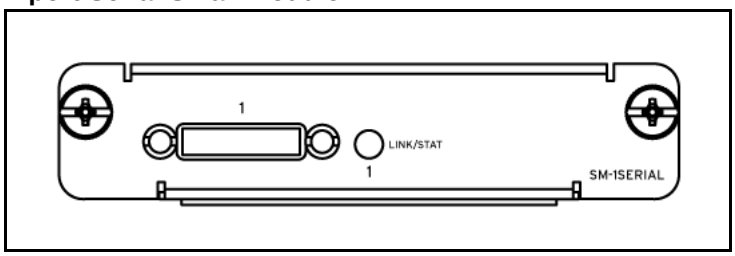
ATTENTION
Slot 2 of the Secure Router 4134 supports only one port of any WAN data Small Module. If you install a 2-port Small Module in Slot 2, and use the Small Module for data connections, one port only is functional (port 1).

This limitation also applies to the 2-port T1/E1 and ISDN BRI Small Modules if they are configured for voice traffic: only port 2/1 is functional. This limitation does not apply to FXS or FXO voice modules.

The 1-port Serial Small Module provides one external multiprotocol serial WAN port. The port operates in either Data Terminal Equipment (DTE) or Data Communications Equipment (DCE) mode at data rates up to 2.0 Mbps. Each serial port supports one bundle only.

The following figure shows the 1-port Serial Small Module.

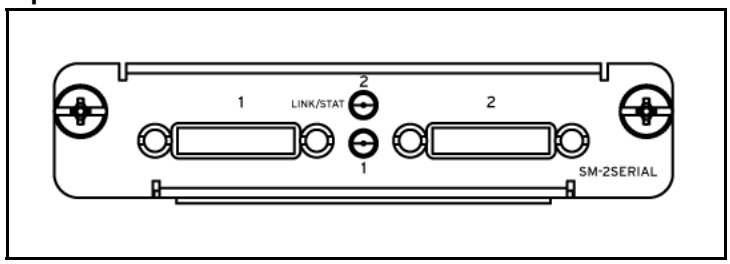
Figure 7
1-port Serial Small Module



The 2-port Serial Small Module provides two external multiprotocol serial WAN ports. Each port operates in either DTE or DCE mode at data rates up to 2.0 Mbps.

The following figure shows the 2-port Serial Small Module.

Figure 8
2-port Serial Small Module



You configure each serial port using the Command Line Interface (CLI). The Secure Router 4134 detects any configuration mismatch with connected cables and signals an error with a red LED.

Table 6
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Cable length summary
Serial	Smart Serial 26-pin	V.35: Up to 11 twisted pairs plus grounds to a 34-pin MRAC-34 connector X.21: Up to 7 twisted pairs plus ground to a DB-15 connector RS-232/V .28: Up to 11 signals plus ground to a DB-25 connector RS-449/V .11: Up to 11 twisted pairs plus ground to a DB-37 connector EIA-530/A: Up to 11 twisted pairs plus ground to a DB-25 connector	None	V.35, X.21, RS-449/V.11, EIA-530/A: Up to 1000 m (3 280 ft) at 100 Kbps, 100 m (328 ft) at 2 Mbps RS-232/V.28: Up to 100 m (328 ft) at 9600 bps, 10 m (33 ft) at 100 Kbps

Table 7
Maximum DTE cable lengths

DTE data rate (kbps)	Maximum DTE cable lengths			
	RS-232C	**V.35**	**RS449/422**	**RS530/422**
56 or 64	10 ft (3.05 m)	4000 ft (1219.2 m)	4000 ft (1219.2 m)	4000 ft (1219.2 m)
224 or 256	N/A	3500 ft (1066.8 m)	1700 ft (518.16 m)	1700 ft (518.16 m)
896 or 1024	N/A	1700 ft (518.16 m)	350 ft (106.68 m)	350 ft (106.68 m)
N/A - not applicable (these rates cannot be used for RS-232C interface)				

Table 8
Serial interface module modes and associated clock rates

Mode	DCE	DTE	Clock rate (Hz)
V.35	Yes	Yes	56000–2000000
X.21	Yes	Yes	56000–2000000
RS-232	Yes	Yes	1200–115000
RS-449	Yes	Yes	56000–2000000
EIA-530	Yes	Yes	56000–2000000
EIA-530A	Yes	Yes	56000–2000000

Table 9
Module LEDs

LED	Description
LINK/STAT 1	Status of interface 1: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
LINK/STAT 2	Status of interface 2: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
When you power on the Secure Router 4134 with a serial configuration, the serial interface software polls the port hardware status to ensure the connected cable matches the port configuration. If a connected cable does not match the cable type and operational mode settings, the interface LED turns red and the port hardware is disabled. This prevents damage to internal and external hardware components.	

FXS Small Module

The 2- and 4-port FXS Small Modules are hot-swappable modules.

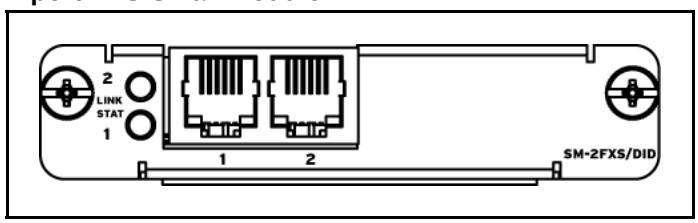
If you are working with 2- or 4-port FXS or FXO Small Modules, ensure you read the safety messages related to the FXS and FXO interface modules. See “Foreign Exchange Station (FXS) Interface Modules” (page 15) and “Foreign Exchange Office (FXO) Interface Modules” (page 16).

The FXS Small Modules support only voice TDM connections. The FXS Small Modules provide voice interface access through each of the FXS ports. The FXS Small Module represents the Central Office (CO) side of a telephony interface.

You can install the 2- and 4-port FXS Small Modules in any of the Small Module slots on the Secure Router 4134 chassis. You can also install the FXS Small Modules in the Voice Carrier Medium Module, which you can install in any Medium Module slot.

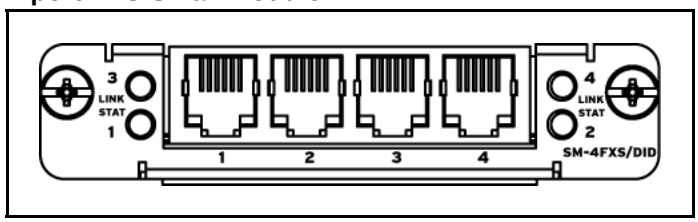
The following figure shows the 2-port FXS Small Module.

Figure 9
2-port FXS Small Module



The following figure shows the 4-port FXS Small Module.

Figure 10
4-port FXS Small Module



The following table lists the connectors and cable to use with the 2- and 4-port FXS Small Modules.

Table 10
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Loop length
FXS	RJ11	24 AWG Category 5 twisted pair cable	N/A	5500 ft (1676.4 m)

ATTENTION
Ensure you use straight cables with FXS modules. TIP must connect to TIP and RING must connect to RING. FXS ground start does not work if polarity is reversed.

The following table describes the LED states for the 2- and 4-port FXS Small Modules.

Table 11
Module LEDs

LED	Description
LINK/STAT 1	Status of interface 1: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
LINK/STAT 2	Status of interface 2: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
LINK/STAT 3 (applicable to 4-port module only)	Status of interface 3: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls

Table 11
Module LEDs (cont'd.)

LED	Description
LINK/STAT 4 (applicable to 4-port module only)	Status of interface 4: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
Embedded LEDs at the RJ11 ports	Activity at the interface: • Red: The module is up, but the interface is not configured • Amber: The interface is configured and ready to use • Green: The interface has an active call

FXO Small Module

The 2- and 4-port FXO Small Modules are hot-swappable modules.

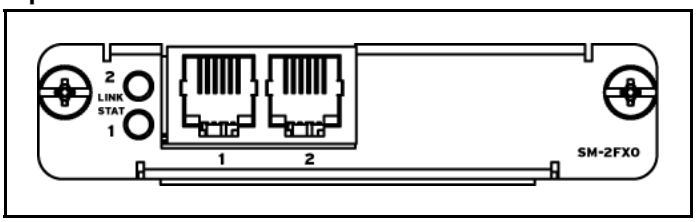
If you are working with 2- or 4-port FXS or FXO Small Modules, ensure you read the safety messages related to the FXS and FXO interface modules. See "Foreign Exchange Station (FXS) Interface Modules" (page 15) and "Foreign Exchange Office (FXO) Interface Modules" (page 16).

The FXO Small Modules support only voice TDM connections. The FXO Small Modules provide voice interface access through each of the FXO ports. The FXO Small Module represents the Customer Premises Equipment (CPE) side of a telephony interface.

You can install the 2- and 4-port FXO Small Modules in any of the Small Module slots on the Secure Router 4134 chassis. You can also install the FXO Small Modules in the Voice Carrier Medium Module, which you can install in any Medium Module slot.

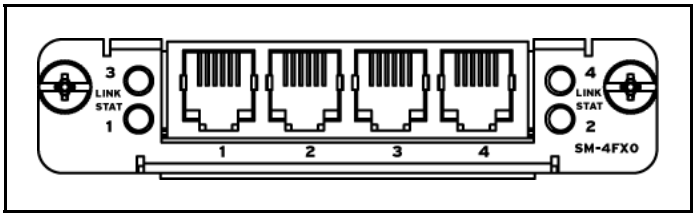
The following figure shows the 2-port FXO Small Module.

Figure 11
2-port FXO Small Module



The following figure shows the 4-port FXO Small Module.

Figure 12
4-port FXO Small Module



The following table lists the connectors and cable to use with the 2- and 4-port FXO Small Modules.

Table 12
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Loop length
FXO	RJ11	24 AWG Category 5 twisted pair cable	N/A	5500 ft (1676.4 m)

ATTENTION
Ensure you use straight cables with FXO modules. TIP must connect to TIP and RING must connect to RING.

The following table describes the LED states for the 2- and 4-port FXO Small Modules.

Table 13
Module LEDs

LED	Description
LINK/STAT 1	Status of interface 1: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
LINK/STAT 2	Status of interface 2: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls

Table 13
Module LEDs (cont'd.)

LED	Description
LINK/STAT 3 (applicable to 4-port module only)	Status of interface 3: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
LINK/STAT 4 (applicable to 4-port module only)	Status of interface 4: • Red: The port is not configured • Green: A call is in progress • Yellow: The port is configured and ready to accept calls
Embedded LEDs at the RJ11 ports	Activity at the interface: • Red: The module is up, but the interface is not configured • Amber: The interface is configured and ready to use • Green: The interface has an active call

T1/E1 Medium Module

The 8-port T1/E1 Medium Module provides eight T1 ports (each port supports 24 data timeslots with a line data rate of 1.544 Mbps) or eight E1 ports (each port supports 31 data timeslots with a line data rate of 2.048 Mbps). The module supports up to 128 logical channels.

The following figure shows the 8-port T1/E1 Medium Module.

Figure 13
8-port T1/E1 Medium Module

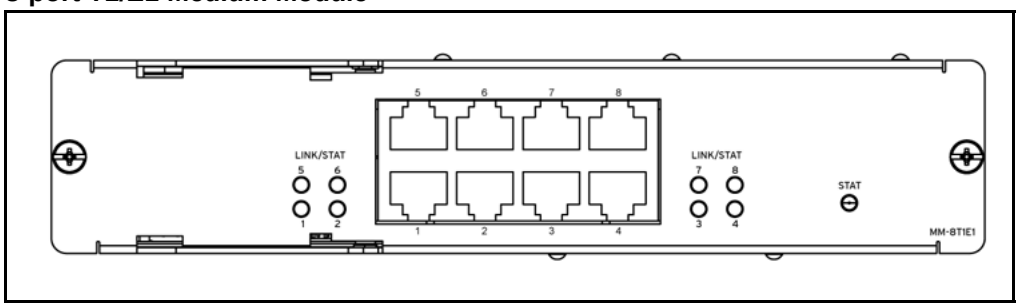


Table 14
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
T1/E1	RJ45	T1: Dual twisted pair, 100 ohm, CAT3 or better E1: Dual shielded twisted pair, 120 ohms, or dual 75 ohm coax cables	None	T1: DSX1 (interior) from 0 to 655 ft. DS1 (exterior) from 0 to approximately 15 000 ft.

Table 15
Module LEDs

LED	Description
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational.
LINK/STAT 1–8	Status of each interface (1 through 8): • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal

HSSI Medium Module

The 1-port High Speed Serial Interface (HSSI) Medium Module provides one external multiprotocol HSSI serial WAN port that operates at up to 52.0 Mbps. The HSSI Medium Module operates in DTE or DCE mode.

The following figure shows the 1-port HSSI Medium Module.

Figure 14
1-port HSSI Medium Module

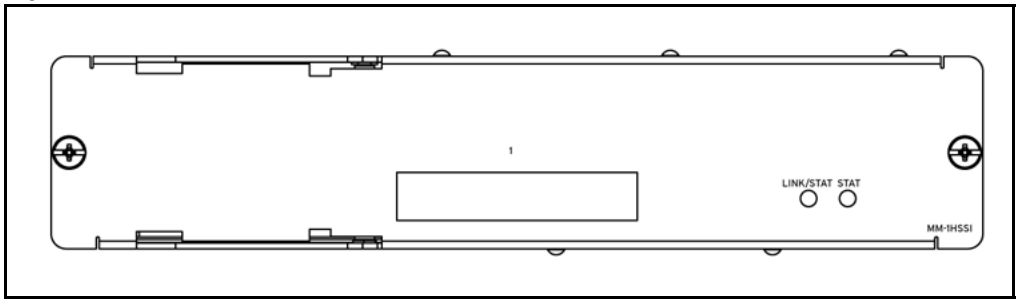


Table 16
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
High-speed serial	50-pin HSSI	HSSI null modem cable	None	50 ft (15 m)

Table 17
Module LEDs

LED	Description
LINK/STAT	Status of interface: • Off: Not connected or the interface is out of service. • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational

CT3 Medium Module

The 1-port CT3 Medium Module provides a single channelized T3 port operating at 44.736 Mbps for WAN access.

The following figure shows the 1-port CT3 Medium Module.

Figure 15
1-port CT3 Medium Module

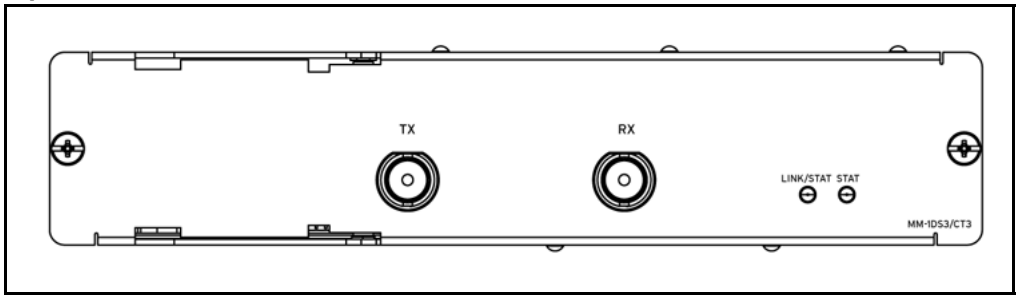


Table 18
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
CT3	Two BNC connectors — one for transmit and one for receive	Two 75 ohm unbalanced coax cables (RG-179 typical)	None	450 ft (137.16 m)

Table 19
Module LEDs

LED	Description
LINK/STAT	Status of interface: • Off: Not connected or the interface is out of service • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational

DS3 Medium Module

The 1-port DS3 Medium Module provides a single clear channel T3 port operating at 44.736 Mbps for WAN access.

ATTENTION
The Clear Channel DS3 interface module does not support the use of the M13 framing format. Use only the default framing format of C-BIT on Clear Channel DS3 interface modules.

The following figure shows the 1-port DS3 Medium Module.

Figure 16
1-port DS3 Medium Module

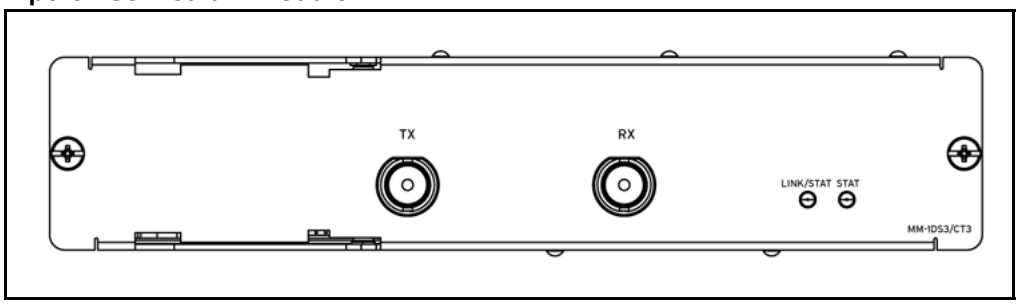


Table 20
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
DS3	Two BNC connectors — one for transmit and one for receive	Two 75 ohm unbalanced coax cables (RG-179 typical)	None	450 ft (137.16 m)

Table 21
Module LEDs

LED	Description
LINK/STAT	Status of interface: • Off: Not connected or the interface is out of service • Yellow: The interface is in a loopback mode or is running diagnostics • Green: The link or channel is active and receiving a valid signal
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational

GbE Medium Module

The 10-port 10/100/1000 Ethernet Advanced L2/L3 Medium Module provides ten autonegotiating 10/100/1000 Mbps copper Ethernet ports and two SFP Gigabit Ethernet ports (full duplex). Up to ten ports can be in use at one time. The module is non-blocking. The 10-port GbE Medium Module provides both Layer 2 switching and Layer 3 routing functionality.

You can use copper port 5 or fiber port 5—you cannot use both simultaneously (the same is true for copper port 10 and fiber port 10). If a copper cable and a fiber cable are connected to the same port (port 5, for example), the module uses the first active link. If you disconnect the active link, the module automatically switches to the remaining connection.

The following figure shows the 10-port GbE Medium Module.

Figure 17
10-port GbE Medium Module

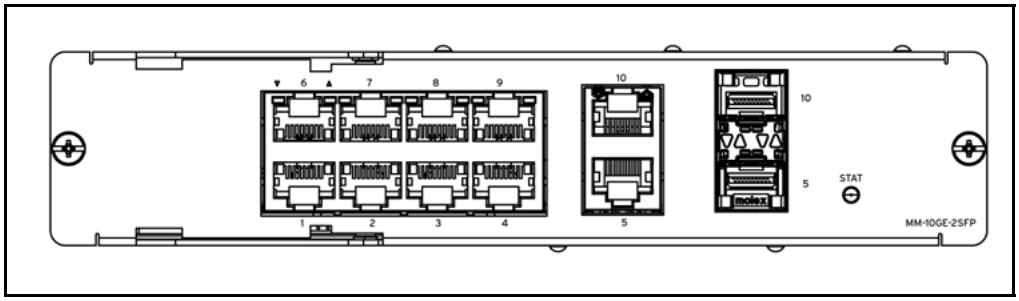


Table 22
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
10Base-T (full- or half-duplex), 100Base-TX (full duplex), 1000Base-T (full-duplex)	RJ45	EIA Category 3, 4, or 5 UTP for 10 Mb/s operation. EIA Category 5 UTP or STP required for 100/1000 Mb/s operation.	None	328 ft (100 m)
Fiber ports	SFP module	Typical SFP Modules: 1000BASE-LX 62.5µm or 62.5µm fiber cable (two fibers) 1000BASE-LX 10µm fiber cable (two fibers) 1000BASE-SX 62.5µm fiber cable (two fibers) 1000BASE-SX 50µm fiber cable (two fibers)	None	550 m = 1 800 ft 5000 m = 16 400 ft 220 m = 722 ft 500 m = 1 640 ft

Table 23
Module LEDs

LED	Description
STAT	General module status: • Off: No power available to the module • Yellow: Out of service, or failed to initiate • Green: Power on and the module is operational
10/100/1000 BASE-T PORT STATUS	LEDs are integrated into each port. Status of each interface: • Off: Link not connected or Link Fail • Solid Green: Link established at 10 or 100 Mbps • Solid Orange: Link established at 1000 Mbps • Blinking Green/Orange: Receiving/transmitting traffic
SFP PORT STATUS	LEDs are integrated into each port. Status of each interface: • Off: Link not connected or Link Fail • Solid Orange: Link established at 1000 Mbps • Blinking Orange: Receive/transmit traffic

FE and FE/PoE Medium Module

The 24-port Fast Ethernet and Fast Ethernet/Power-Over-Ethernet Medium Modules each provide 24 Ethernet ports that support 10 Mbps and 100 Mbps operation over unshielded twisted pair (UTP) wiring. The module is non-blocking. The 24-port FE and FE/PoE Medium Modules provide both Layer 2 switching and Layer 3 routing functionality.

The following figures show the 24-port FE and the 24-port FE/PoE Medium Modules.

Figure 18
24-port FE Medium Module

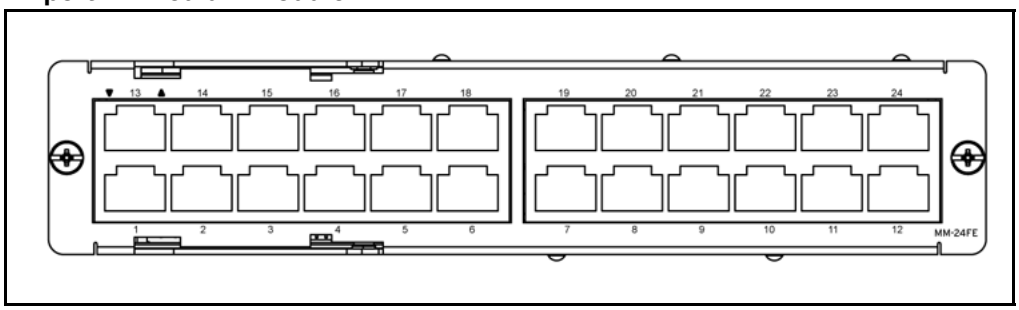
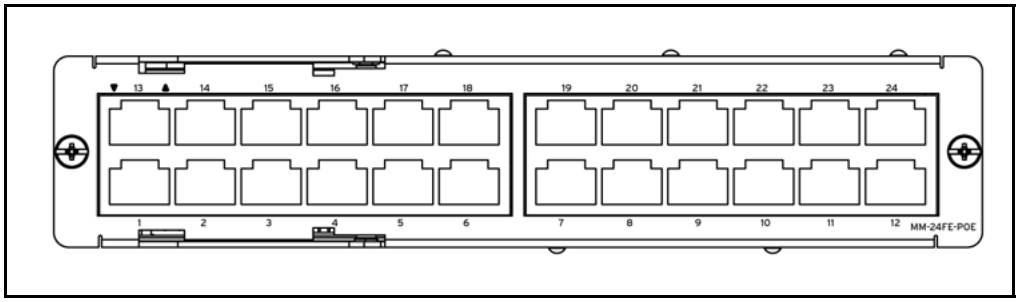


Figure 19
24-port FE/PoE Medium Module



ATTENTION
You must install the Secure Router 4134 PoE power supply to take advantage of the PoE capabilities.

Table 24
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
10Base-T (full- or half-duplex), 100Base-TX (full duplex)	RJ45	EIA Category 3, 4, or 5 UTP for 10 Mb/s operation. EIA Category 5 UTP or STP required for 100 Mb/s operation.	None	328 ft (100 m)

Table 25
Module LEDs

LED	Description
10/100 BASE-T PORT STATUS	LEDs are integrated into each port. Status of each interface: • Off: Link not connected or Link Fail • Solid Green: Link established at 10 or 100 Mbps • Blinking Green: Receiving/transmitting traffic

Mediation Server Module for OCS

The Mediation Server Module for OCS is a hot-swappable module.

The Mediation Server Module has the following ports:

- two USB 2.0 type ‘A’ host ports
- one SVGA DB15 video port
- one RJ45 console port
- one Compact Flash port

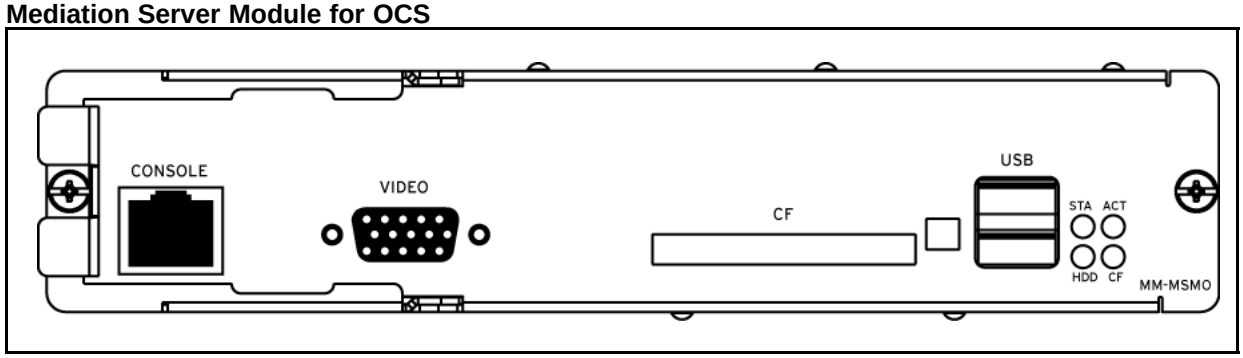
The Mediation Server Module for OCS includes an onboard 60 GB Serial ATA (SATA) hard disk drive for storage of application software, configuration information, and application data. The Mediation Server Module has a processor, Boot Flash CMOS memory, and DDR-2 SDRAM DIMM memory, which allows the module to operate independently of the main Secure Router 4134 system.

The module ships with one DIMM memory module installed (1 GB). You can install a second DIMM memory module, if necessary. You must remove the Mediation Server Module from the Secure Router 4134 to install or remove DIMM memory modules.

You can insert or remove a Compact Flash card in the Mediation Server Module with the module installed and running.

The following figure shows the Mediation Server Module for OCS.

Figure 20
Mediation Server Module for OCS



The following table specifies connectors and recommended cable types and lengths.

Table 26
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
Console	RJ45	Up to 7 signals plus ground	N/A	Up to 328 ft (100 m) at 9600 bps
Video	HD15F (female)	VGA cable	N/A	N/A

The following table describes the Mediation Server Module LED indicators.

Table 27
Module LEDs

LED	Description
STA	Operational status of the module: • Off: There is no power present, or the unit has completed a boot or self-diagnostics test and is ready for use • Amber, slow blink: The module is in a sleep state • Amber, blinking: A boot or self-diagnostics test is running
ACT	Release 10.1 does not support the activity status (ACT) LED. The ACT LED is always off.
HDD	Status of hard disk drive: • Off: There is no activity at the hard drive (that is, no device is accessing the hard drive) • Green, blinking: There is activity at the hard drive (that is, at least one device is accessing the hard drive)
CF	Status of Compact Flash card: • Off: There is no Compact Flash card installed, or the installed Compact Flash card is not ready for activity • Green, solid: The installed Compact Flash card is ready for access • Green, blinking: There is activity at the Compact Flash card

Voice Carrier Medium Module

The Voice Carrier Medium Module is a hot-swappable module.

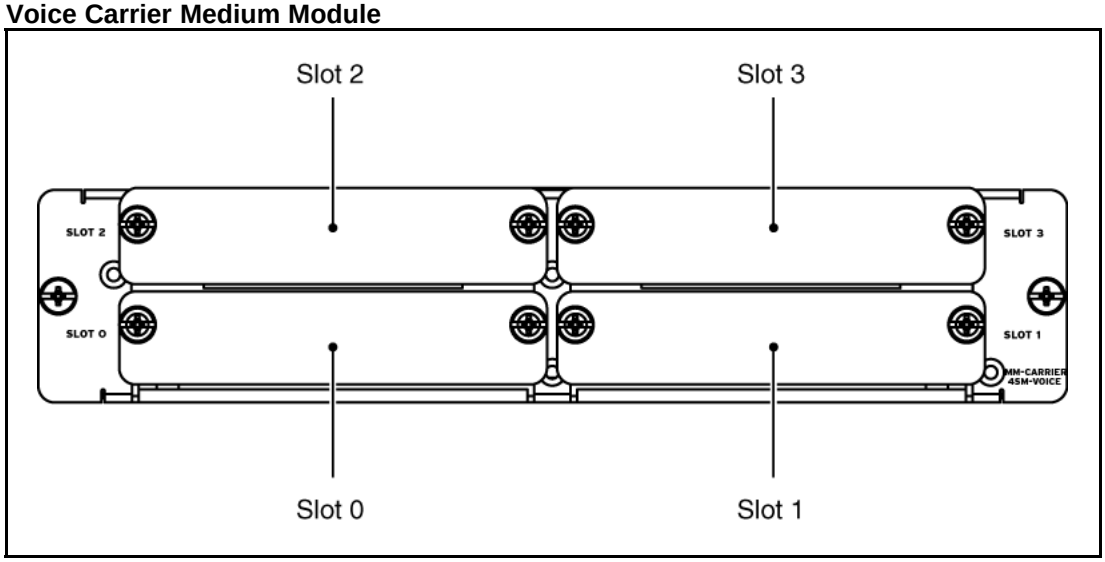
The Secure Router 4134 supports the following voice-type Small Modules:

- 2- and 4-port FXO
- 2- and 4-port FXS

You can install the supported voice-type Small Modules in any combination in the Voice Carrier Medium Module.

The following figure shows the 4-slot Voice Carrier Medium Module with slot covers installed and identifies the slot numbers.

Figure 21
Voice Carrier Medium Module



CAUTION
If you do not install a module in a slot, keep the metal cover plate in place over the slot. Removing the cover plate impedes airflow and proper cooling of the unit.

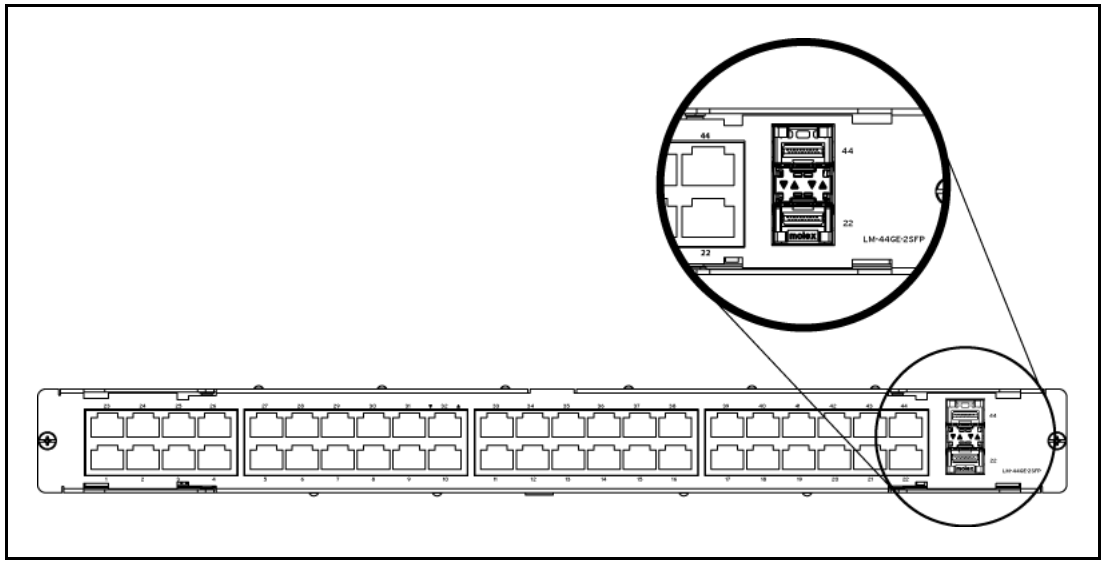
GbE Large Module

The 44-port 10/100/1000 Large Module provides 44 Ethernet ports that each support 10/100/1000 Mbps operation over unshielded twisted pair (UTP) wiring, as well as two SFP optical ports. Up to 44 ports can be in use at one time.

The 44-port GbE Large Module provides both Layer 2 switching and Layer 3 routing functionality.

The following figure shows the 44-port GbE Large Module.

Figure 22
44-port GbE Large Module



This module is oversubscribed and provides a 4:1 blocking ratio. The total available bandwidth at all of the ports (44 Gbps) is four times the available routing bandwidth.

There are three groups on the module: one group has 12 ports, and two groups have 16 ports each. For Layer 2 switching within each group, packets can be switched at full bandwidth. However, for Layer 2 switching between groups and for all packets that are routed (Layer 3), all external ports must share a limited number of links on the module. There are three links available within the group of 12 ports, and there are four links available within each group of 16 ports. There is, therefore, a 12:3 (4:1) or 16:4 (4:1) contention for the internal links.

Table 28
Cable and connectors

Port	Connector	Recommended cable type	Minimum cable length	Maximum cable length
10Base-T (full- or half-duplex), 100Base-TX (full duplex), 1000Base-T (full duplex)	RJ45	EIA Category 3, 4, or 5 UTP for 10 Mb/s operation. EIA Category 5 UTP or STP required for 100/1000 Mb/s operation.	None	328 ft (100 m)

Table 29
Module LEDs

LED	Description
10/100/1000 BASE-T PORT STATUS	LEDs are integrated into each port. Status of each interface: • Off: Link not connected or Link Fail • Solid Green: Link established at 10 or 100 Mbps • Solid Orange: Link established at 1000 Mbps • Blinking Green or Orange: Receiving or transmitting traffic
SFP PORT STATUS	LEDs are integrated into each port. Status of each interface: • Off: Link not connected or Link Fail • Solid Orange: Link established at 1000 Mbps • Blinking Orange: Receiving or transmitting traffic

Internal hardware components

There are four internal hardware components that you can service or upgrade:

- DDR SO-DIMM
- VPN/IPSec module
- Packetized Voice Module (PVM)
- Internal system compact flash

The following figure shows the internal hardware components that are field serviceable. For information about locating and removing the service panel to access the internal hardware components, refer to *Nortel Secure Router 4134 Installation — Chassis* (NN47263-300).

Figure 23
Interior of the Secure Router 4134

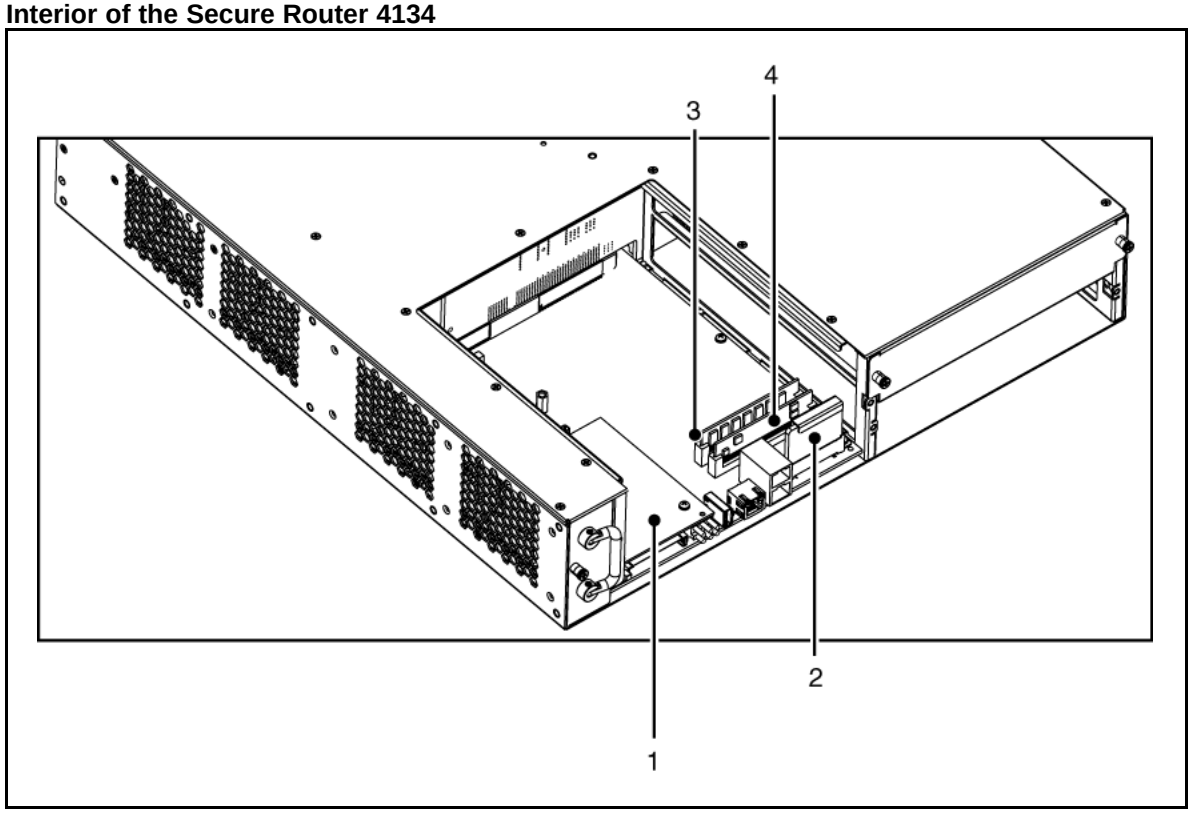


Table 30
Internal components of the Secure Router 4134

Item	Description
1	VPN/IPSec module
2	Internal Compact Flash (CF0)—contains the system image
3	DDR SO-DIMM
4	PVM

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered. You cannot hot swap internal components.

DDR SO-DIMM

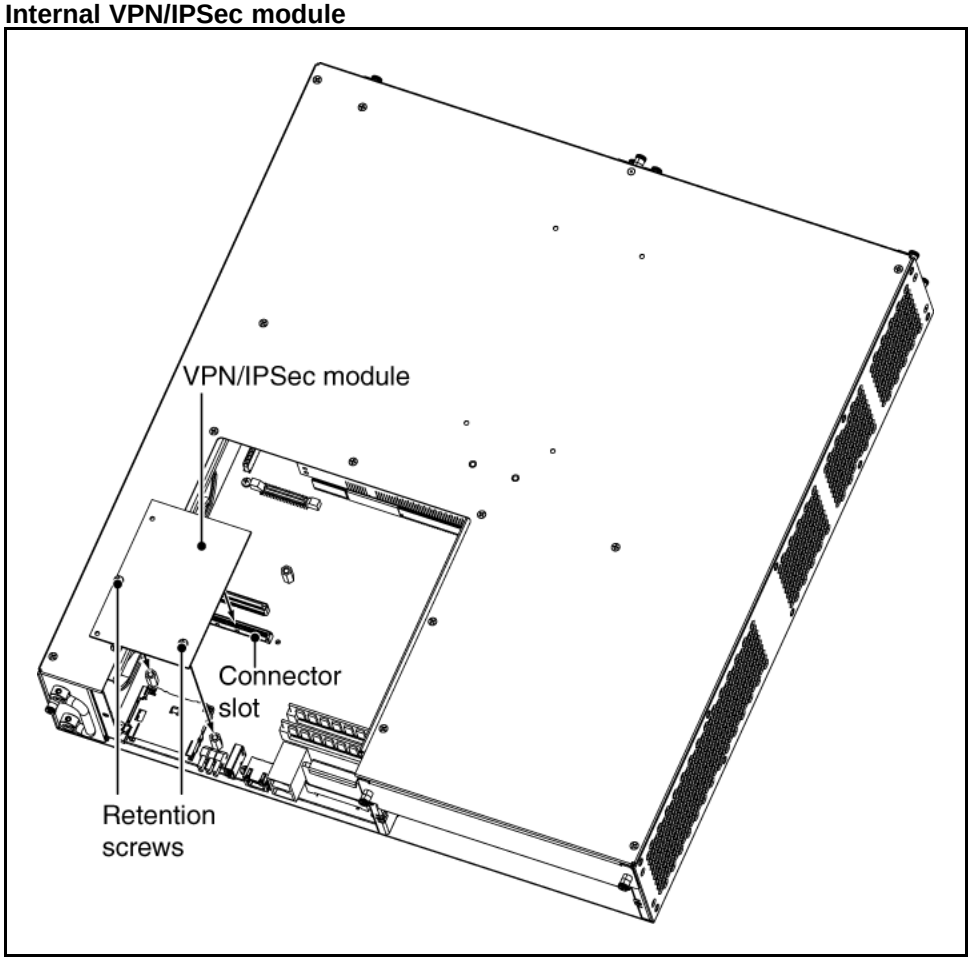
The Secure Router 4134 has one SO-DIMM slot. The slot supports a DDR RAM module of either 512 MB or 1 GB. The router ships with a 1 GB DIMM installed.

VPN/IPSec module

The VPN/IPSec module provides secure processing of packets originating from any external interface, although the VPN module is not directly connected to any external interface.

The VPN module has a 140-pin connector on the bottom of the module, which allows you to install the VPN/IPSec module on the Main Board of the Secure Router 4134. The following figure shows the VPN/IPSec module in relation to the Main Board.

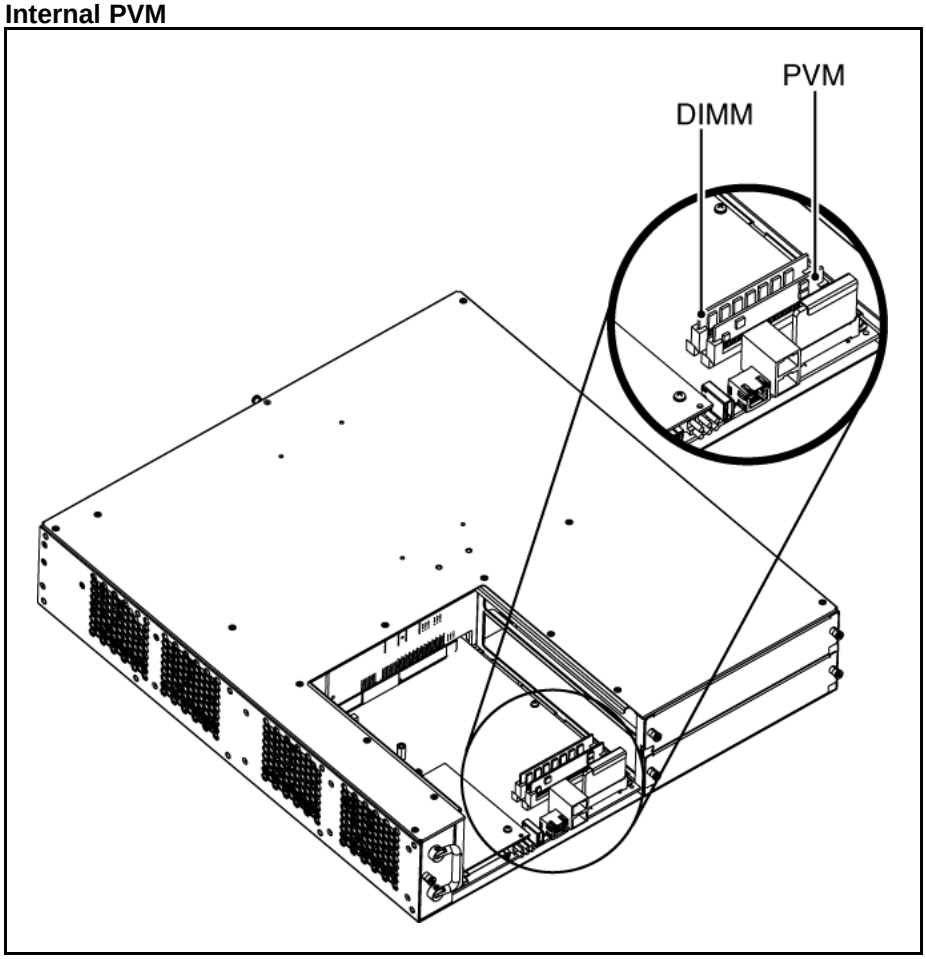
Figure 24
Internal VPN/IPSec module



Internal PVM

You must install the internal PVM in the Secure Router 4134 chassis to use the voice-related modules and features. The following figure shows the PVM in relation to the DDR SO-DIMM.

Figure 25
Internal PVM



The PVM supports up to 128 channels, depending on the voice codec and the voice license agreement you use. For information about the supported voice codecs and the voice-related licensing, see *Nortel Secure Router 4134 Configuration — SIP Media Gateway* (NN47263-508).

The PVM is an internal module and is not directly connected to any external interface.

ATTENTION
You cannot enable the management port on the rear of the Secure Router 4134 (Ethernet 0/0) if you have a PVM installed (this is related to hardware design). Ensure you use Ethernet 0/1, 0/2, 0/3, or 0/4 for management if you use a PVM in the router.

The PVM is field-replaceable, but is not hot-swappable.

Internal system compact flash

The internal compact flash contains the system image. This slot is identified in system software as CF0.

Hot swapping hardware components

This section lists the Secure Router 4134 hardware components that you can service while the system is powered.

The following table lists parts that are operator replaceable, as well as the hot swapping capabilities and limitations for each part.

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

Table 31
Hot swapping capabilities for the Secure Router 4134

Component	Hot swap capable	Limitations
External optional interface modules	Yes	You must replace the interface module with a module of the same type as that you remove. You must insert the replacement module in the same slot as that of the module being removed.
Fan tray	Yes	 **CAUTION** The fan is essential to maintain optimal system operating temperature. If you plan to replace the fan tray while the system power is on, ensure you have another fan tray ready to insert immediately. Watch the fan status LED for alerts.
Power supply units	Yes	 **CAUTION** Watch the power supply status LED for alerts when you hot swap a power supply unit.
External USB drive	Yes	The system automatically discovers a new device.
External Compact Flash card	Yes	The system automatically discovers a new device.

Table 31
Hot swapping capabilities for the Secure Router 4134 (cont'd.)

Component	Hot swap capable	Limitations
All external cables	Yes	—
DDR SO-DIMM	No	 **CAUTION** Do not open the Secure Router 4134 service access panel while the unit is powered.
VPN/IPSec module	No	 **CAUTION** Do not open the Secure Router 4134 service access panel while the unit is powered.
Internal compact flash	No	 **CAUTION** Do not open the Secure Router 4134 service access panel while the unit is powered.
PVM	No	 **CAUTION** Do not open the Secure Router 4134 service access panel while the unit is powered.

Installing Secure Router 4134 hardware components

The Secure Router 4134 ships with the fan tray installed, as well as the power supply unit or units that you ordered. This section contains instructions for installing hardware components, as well as instructions for replacing a fan tray, power supply unit, and internal components.

Navigation

Installing the interface modules

You install the optional interface modules in the front panel of the Secure Router 4134 chassis.

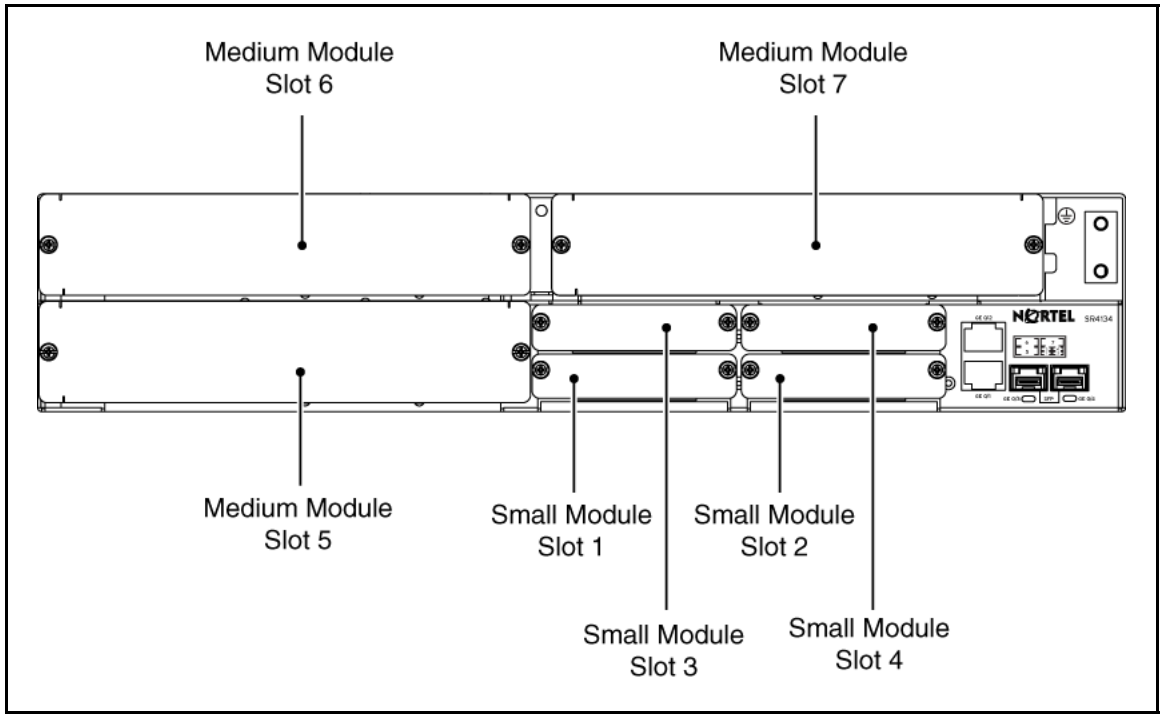
Nortel strongly recommends that you power down the Secure Router 4134 if you are installing an interface module in a slot in which you have not previously installed that module type. If you do not power down the router to install a module, you must reboot the router to use the module. After a module is installed and initialized, you can hot swap that module. For more

information about the Secure Router 4134 hot swap capabilities, see “Hot swapping hardware components” (page 55). To hot swap modules, see “Hot swapping interface modules” (page 63).

The chassis has horizontal slots for small, medium, and large interface modules. The chassis ships with four small slots, and three medium slots. You can adapt two of the medium slots to accommodate a large module (which spans two medium slots). You must order modules separately.

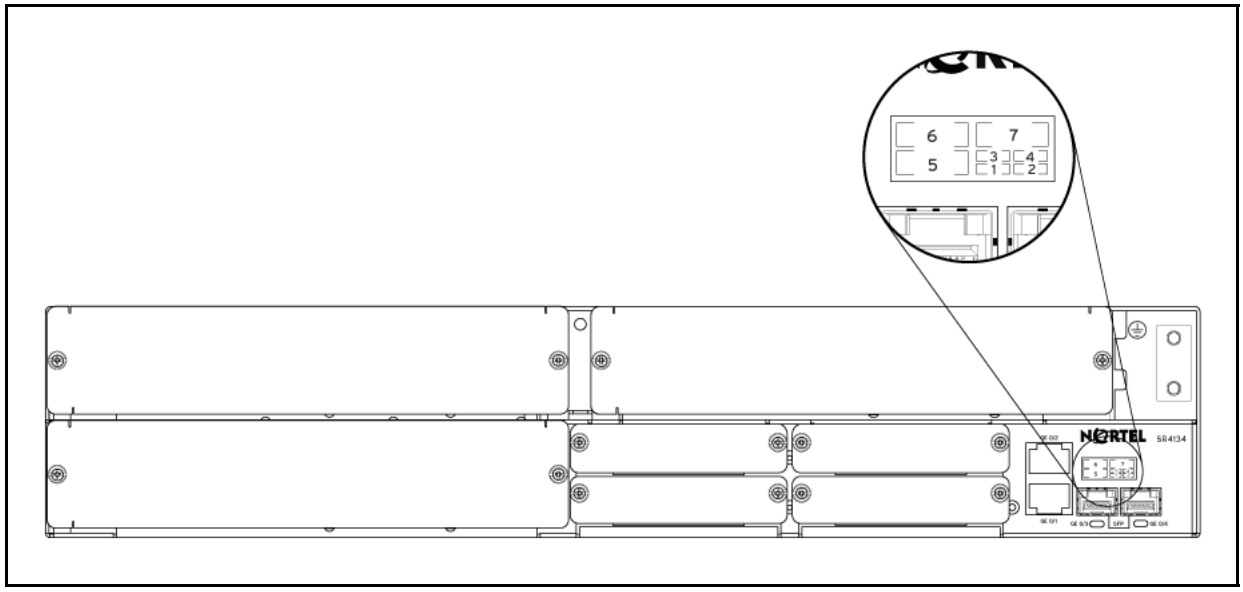
The following figure shows the default slot configuration and indicates how slots are numbered on the Secure Router 4134.

Figure 26
Slot numbering on the Secure Router 4134



A slot numbering legend is printed directly above the chassis SFP Ethernet ports (ports 0/3 and 0/4) on the front panel of the Secure Router 4134. The legend shows how slots are numbered on the Secure Router 4134. The following figure shows the slot numbering legend.

Figure 27
Slot numbering legend printed on the Secure Router 4134



Slots 1–4 are Small Module slots. Slots 5–7 are Medium Module slots. If you insert a Large Module, it spans slots 6 and 7. In this case, the Large Module is identified in the Command Line Interface (CLI) as slot 6.

Average time to install an interface module: 1 minute.

CAUTION
ESD
To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when working with interface modules.

CAUTION
Risk of equipment damage
Always handle interface modules by the edges, or by using the levers, where applicable.

Prerequisites

- Ensure you have a Phillips #2 screwdriver.

Installing a Small Module

Use the procedure in this section to install a Small Module in the Secure Router 4134. For instructions to install a Small Module in the VCMM, see “Installing a Small Module in the Voice Carrier Medium Module” (page 62).

Nortel recommends that you power down the Secure Router 4134 if you are installing an interface module in a slot in which you have not previously installed that module type.

If you are working with 2- or 4-port FXS or FXO Small Modules, ensure you read the safety messages related to the FXS and FXO interface modules. See “Foreign Exchange Station (FXS) Interface Modules” (page 15) and “Foreign Exchange Office (FXO) Interface Modules” (page 16).

Procedure steps

Step	Action
1	Using a Phillips screwdriver #2, remove the slot cover plate from the slot in which you are installing the module.
2	Align the module with the slot and the slot module guides.
3	Slide the module into the chassis until its connector panel touches the chassis back panel.
4	Push gently, but firmly, to seat the connector on the interface module in the chassis back panel.
5	Using a Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

--End--

Installing a Medium Module

Use the instructions in this section to install Medium Modules.

Procedure steps

Step	Action
1	Using a Phillips screwdriver #2, remove the slot cover plate from the slot in which you are installing the module.
2	Align the module with the slot and the slot module guides.
3	Slide the module into the chassis until its connector panel touches the chassis back panel.
4	Push gently, but firmly, to seat the connector on the interface module in the chassis back panel.
5	Ensure the lever on the module is flush with the front panel of the Secure Router 4134.

6 Using a Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

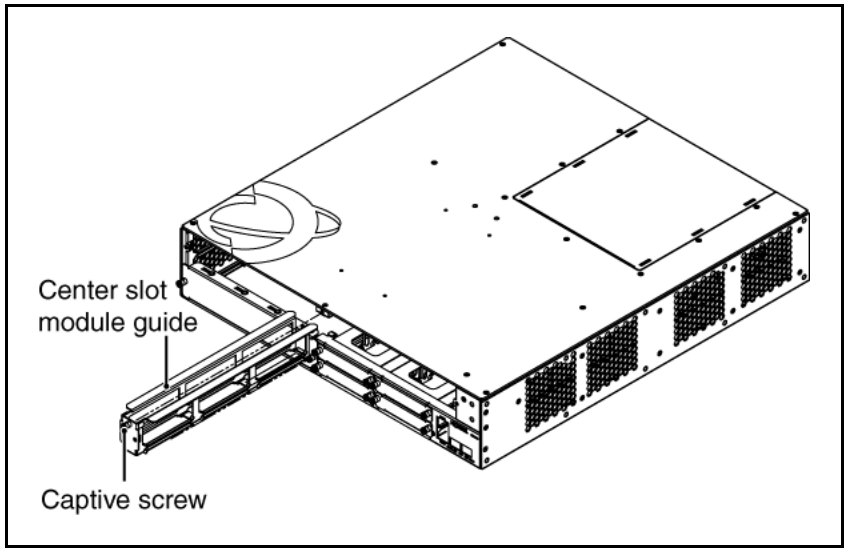
--End--

Installing a Large Module

Install the Large Module in slots 6–7 only.

Procedure steps

Step	Action
1	Using a Phillips screwdriver #2, remove the slot cover plates from slots 6 and 7.
2	Loosen the captive screw at the top of the center slot module guide.
3	Remove the center slot module guide. The following figure shows the removal of the center slot guide.



4	Align the Large Module with the slot and the slot module guides on the outside edges of the slot.
5	Slide the module into the chassis until its connector panel touches the chassis back panel.
6	Push gently, but firmly, to seat the connector on the interface module in the chassis back panel.
7	Ensure the levers on the module are flush with the front panel of the Secure Router 4134.

8 Using a Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

--End--

Installing a Small Module in the Voice Carrier Medium Module

Ensure you securely install the Voice Carrier Medium Module in the Secure Router 4134 chassis before installing Small Modules in the Voice Carrier Medium Module. For instructions to install the Voice Carrier Medium Module in the chassis, see “Installing a Medium Module” (page 60).

If you are working with 2- or 4-port FXS or FXO Small Modules, ensure you read the safety messages related to the FXS and FXO interface modules. See “Foreign Exchange Station (FXS) Interface Modules” (page 15) and “Foreign Exchange Office (FXO) Interface Modules” (page 16).

Average time to install a Small Module in the Voice Carrier Medium Module: 1 minute.

CAUTION
ESD
To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when you work with interface modules. The router does not have an ESD jack—connect the antistatic wrist strap to an ESD jack at your site.

CAUTION
Risk of equipment damage
Always handle interface modules by the edges, or use the levers, where applicable.

CAUTION
If you do not install a module in the slot, be sure to keep the metal cover plate in place over the slot. Removing the cover plate impedes airflow and proper cooling of the unit.

Prerequisites

- Ensure you have a Phillips #2 screwdriver.
- Ensure you have securely installed the Voice Carrier Medium Module in the Secure Router 4134 chassis.

Procedure steps

Step	Action
1	Use a Phillips screwdriver to remove the slot cover plate from the slot in which you will install the Small Module.
2	Align the Small Module with the slot and the slot module guides.
3	Slide the Small Module into the Voice Carrier Medium Module until the Small Module connector touches the back panel of the Voice Carrier Medium Module.
4	Push gently, but firmly, to seat the Small Module connector in the Voice Carrier Medium Module.
5	Use a Phillips screwdriver to tighten the two captive screws that secure the Small Module to the Voice Carrier Medium Module.

--End--

Hot swapping interface modules

If an interface module fails and you must replace it, you can hot swap the module. All of the Secure Router 4134 external interface modules are hot swappable.

Use the procedure in this section to hot swap all external interface modules.

ATTENTION
Hot swap an interface module only if the Secure Router 4134 recognizes the card. When a card fails to initialize, the Secure Router 4134 should still recognize that the module is installed. Use the **`show chassis`** command to verify that the Secure Router 4134 recognizes that the interface module is installed.

ATTENTION
You must replace the interface module with a module of the same type as that you remove. You must insert the replacement module in the same slot from which you remove the failed interface module.

Traffic on the interface module you are hot swapping is interrupted during the hot swap procedure. Traffic on other interface modules is unaffected.

Prerequisites

- You must save your configuration. If you do not save your current configuration before hot swapping a module, the Secure Router 4134

uses the last saved configuration. To save your configuration, enter **save local**.

- Ensure you have the replacement interface module ready to install.

Procedure steps

Step	Action
1	To verify that the Secure Router 4134 recognizes the interface module, enter: **show chassis** Proceed with the hot swap of the interface module if, and only if, the interface module appears in the list of installed modules on the Secure Router 4134. If the interface module does not appear in the list of installed modules, see Nortel Secure Router 4134 — Troubleshooting (NN47263-700).
2	To access the configuration mode, enter: **configure terminal**
3	To select the interface module you want to shutdown, enter: **chassis module <slot>** Do not enter a port number.
4	To shut down the interface module, enter: **shutdown** It can take longer for the Mediation Server Module to shut down compared to other modules because the Mediation Server Module must wait for the Windows Server 2003 operating system to shut down properly.
5	To verify the change in status of the module, enter: **show chassis**
6	Remove the interface module from the Secure Router 4134.
7	Move the cables from the module you removed to the replacement module. You must connect each cable in the same port on the replacement module that the cable occupied in the module you removed.
8	Insert the replacement interface module in the slot, securing it firmly with the captive screws. Ensure you are in configuration mode, then enter the following command to select the replacement module: **chassis module <slot>**
9	Enter the following command to set the replacement module to an active state: **no shutdown**

10	To verify the module status, enter: **`show chassis`**

--End--

If you encounter issues initializing the replacement interface module, see Nortel Secure Router 4134 — Troubleshooting (NN47263-700).

Connecting power cables

There are two types of power supply modules available for the Secure Router 4134:

- AC power supply module (standard or PoE) requiring an external AC power source
- DC power supply module requiring an external DC power source

Use the procedures in this section to connect AC and DC power cables to a Secure Router 4134.

Connecting AC power cables

Average time to install one AC power cable: 1 minute.

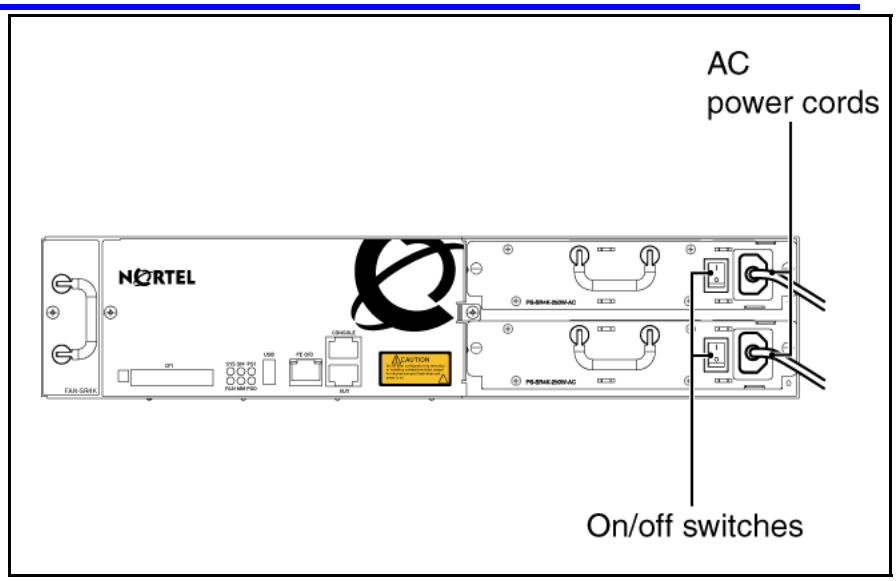
CAUTION
ESD
Always wear an ESD-preventative wrist strap when connecting cables or performing maintenance on a Secure Router 4134. Ensure that the wrist strap makes contact with your skin.

Prerequisites

- Ensure you have one or two appropriately rated AC power cords, dependent on your configuration.
- Ensure the power cord or cords are long enough that you can plug the male end into a standard 110/220 V AC power outlet.

Procedure steps

Step	Action
1	Insert the female end of an appropriately rated AC power cord in the AC receptacle on the rear panel of the Secure Router 4134, as shown in the following figure.



2 Insert the male end of the power cord in a standard 110/220 V AC power outlet.

CAUTION
Ensure you use an appropriately rated AC power cord only. Do not use an extension cord.

--End--

Connecting DC power

Average time to install one DC power cable: 3 minutes.

CAUTION
ESD
Always wear an ESD-preventative wrist strap when connecting cables or performing maintenance on a Secure Router 4134. Ensure that the wrist strap makes contact with your skin.

CAUTION
As a general safety precaution, ensure you provide DC power through either a fuse or DC circuit breaker with a maximum rating of 12 amps.

Prerequisites

- Ensure you have 18 AWG copper wire with an appropriate terminal (lug). You require two wires for single source power, and four wires for redundant power supplies (that is, two wires for each input).
- Ensure you have a Phillips #2 screwdriver.
- Ensure you have a Flathead screwdriver for tightening terminals.

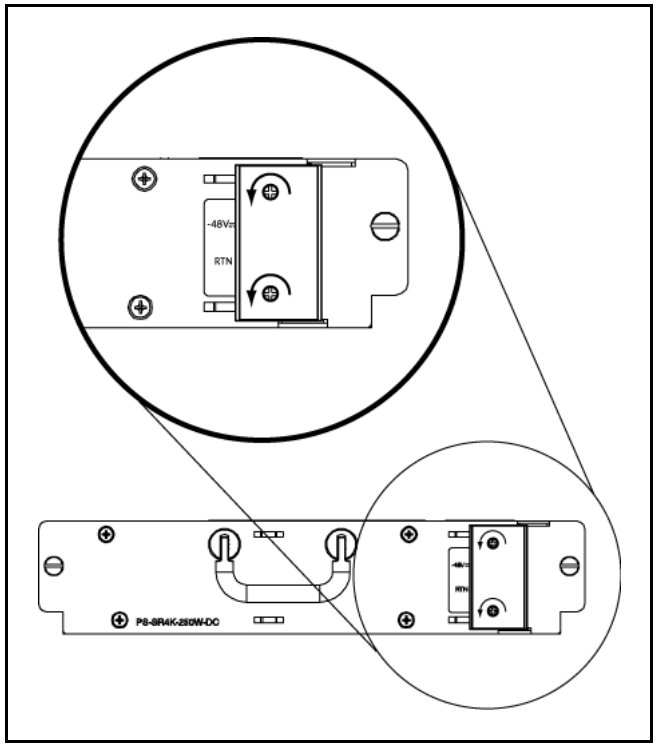
DANGER
Ensure that you remove the proper amount of insulation from copper wires when installing the terminals (lugs). Ensure that there are no exposed wires.

Procedure steps

Step	Action
1	Switch off the DC power source.

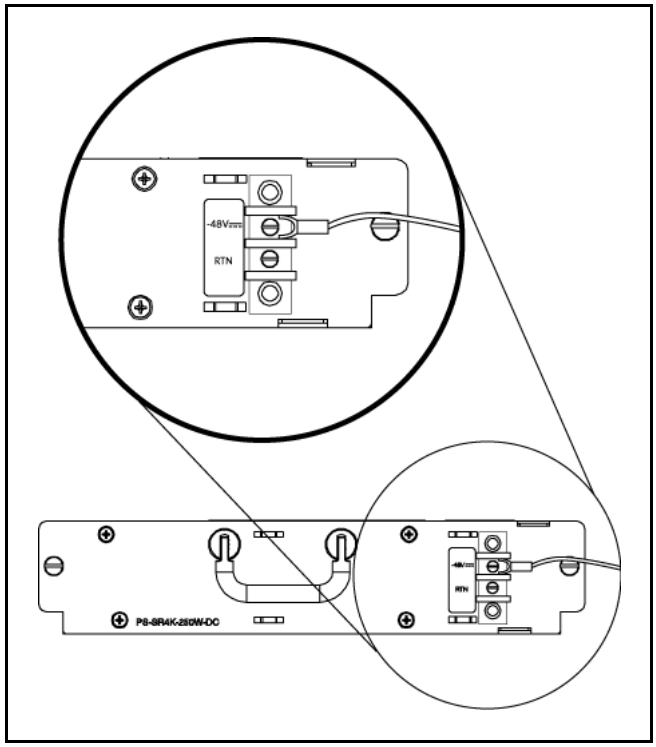
DANGER
Before continuing with this procedure, ensure that the DC power source is switched off.

2 Loosen both terminal cover screws on the DC power supply.



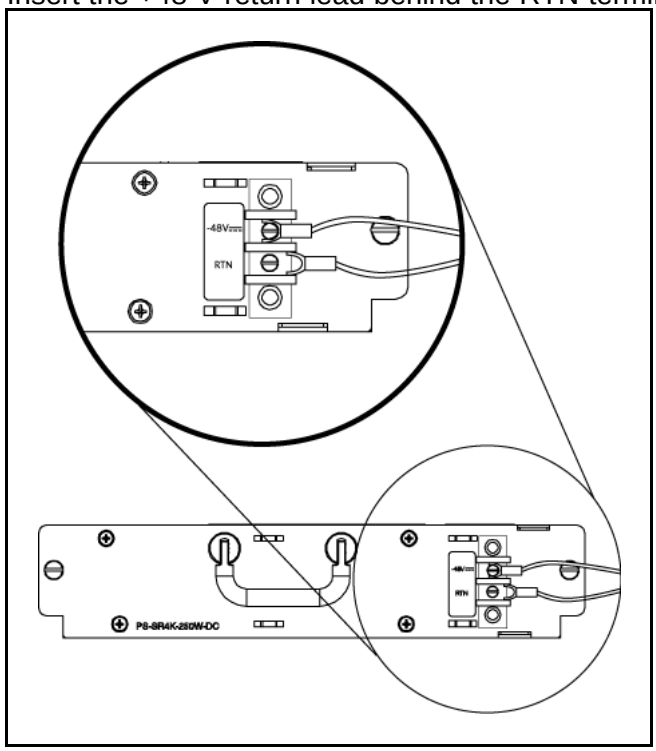
3 Remove the terminal cover to expose the terminal block.

4 Insert the –48 V lead behind the –48 V terminal.



5 Tighten the –48 V terminal to hold the lug and wire in place. The maximum tightening torque for terminal screws is 9 in-lb (1.02 N-m).

6 Insert the +48 V return lead behind the RTN terminal.



7 Tighten the RTN terminal to hold the lug and wire in place.
The maximum torque for tightening terminal screws is 9 in-lb (1.02 N-m).

8 Place the terminal cover over the terminal block.

9 Replace the terminal cover screws.
The maximum tightening torque for terminal cover screws is 4 in-lb (0.45 N-m).

10 Use a cable tie to bind the wires.
Use at least four cable ties spaced at four-inch intervals. Place the first tie within six inches of the terminal block. Position the bound wires to prevent accidental contact when passing by the Secure Router 4134.

11 Attach the other ends of the leads to a – 48 V DC power source.

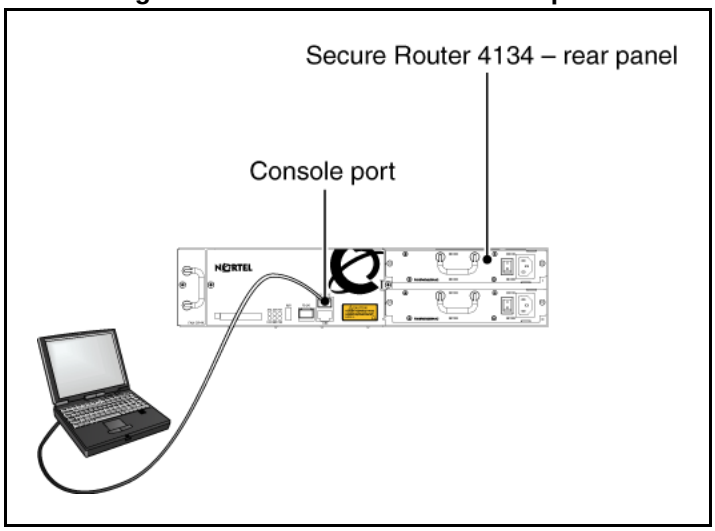
--End--

Connecting the console port cable

You use the console port to perform initial system configuration.

The following figure shows a laptop connected to the console port on the rear of the Secure Router 4134.

Figure 28
Connecting a local terminal to the console port



To access the command line interface (CLI) using the rear panel console port, connect a terminal or a workstation running terminal emulation software to the Secure Router 4134 using the console cable that ships with the unit.

Average time to connect the console port cable to a local terminal: 1 minute.

Prerequisites

- Ensure you have the supplied console cable ready to install.
- Ensure you have the supplied female DB-9 to RJ-45 adapter if you require it for connection to your terminal or PC.
- Ensure you have the Secure Router 4134 securely installed in the equipment rack.

Procedure steps

Step	Action
1	Insert the male RJ-45 connector in the console port on the rear panel of the Secure Router 4134.
2	Connect the female DB-9 to RJ-45 adapter to the opposite end of the console cable, if necessary.
3	Insert the RJ-45 or female DB-9 connector (dependent on your equipment) in a terminal or PC.

--End--

Installing or replacing a power supply module

The Secure Router 4134 operates with one or two AC power supply modules, one or two DC power supply modules, or one AC and one DC power supply module. You install the power supply modules at the rear of the unit.

Average time to install or replace one power supply module: 1 minute.

CAUTION
Risk of equipment damage
Watch the power supply status LED for alerts if you hot swap a power supply module.

CAUTION
ESD
To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when performing maintenance on a Secure Router 4134. Ensure that the wrist strap makes contact with your skin.

Prerequisites

- Ensure you have the power supply module for the Secure Router 4134.
- Ensure you have a Phillips #2 screwdriver.

Procedure steps to install a power supply unit

Step	Action
1	Use a Phillips screwdriver to loosen the two screws that secure the metal plate that covers the slot in which you want to install the power supply unit.
2	Remove the cover plate.
3	Insert the new power supply unit in the power supply slot.
4	Push the power supply unit gently, but firmly, to insert it fully into the internal connection port. When the power supply is fully inserted, the front of the power supply unit is flush with the rear panel of the router.
5	Secure the power supply in the chassis by tightening the two retaining screws.

--End--

Procedure steps to replace a power supply unit

Step	Action
1	Use a Phillips screwdriver to loosen the two screws that secure the power supply unit that you must replace.
2	Grasp the handle on the power supply unit.
3	Pull the power supply unit from the slot.
4	Place the power supply unit on antistatic material.
5	Insert the replacement power supply unit in the power supply slot.
6	Push the power supply unit gently, but firmly, to insert it fully into the internal connection port. When the power supply is fully inserted, the front of the power supply unit is flush with the rear panel of the router.
7	Secure the power supply in the chassis by tightening the two retaining screws.

--End--

Replacing a fan tray module

The Secure Router 4134 ships with the fan tray module installed. This section contains instructions for replacing a fan tray module.

Average time to install or replace a fan tray module: 1 minute.

CAUTION
Risk of equipment damage
The fan is essential for maintaining optimal system operating temperature. If you plan to replace the fan tray module while the system power is on, ensure you have another fan tray module ready to insert immediately. Watch the fan status LED for alerts.

CAUTION
ESD
To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an ESD jack when performing maintenance on a Secure Router 4134. Ensure that the wrist strap makes contact with your skin.

Prerequisites

- Ensure you have the replacement fan tray module for the Secure Router 4134.
- Ensure you have a Phillips #2 screwdriver.

Procedure steps

Step	Action
1	Using a Phillips screwdriver, loosen the screw that secures the fan tray module.
2	Grasp the handle on the fan tray module.
3	Pull the fan tray module from the slot.
4	Insert the replacement fan tray module immediately.
5	Secure the fan tray module in the chassis by tightening the retaining screw.

--End--

Installing or removing the internal VPN/IPSec module

Use the instructions in this section to install, remove, or replace the internal VPN/IPSec module. This internal module is not hot-swappable.

If you ordered the VPN/IPSec module with your Secure Router 4134, the Secure Router ships with the VPN/IPSec module installed.

Average time to install the internal VPN/IPSec module: 2 minutes.

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

Installing the internal VPN/IPSec module

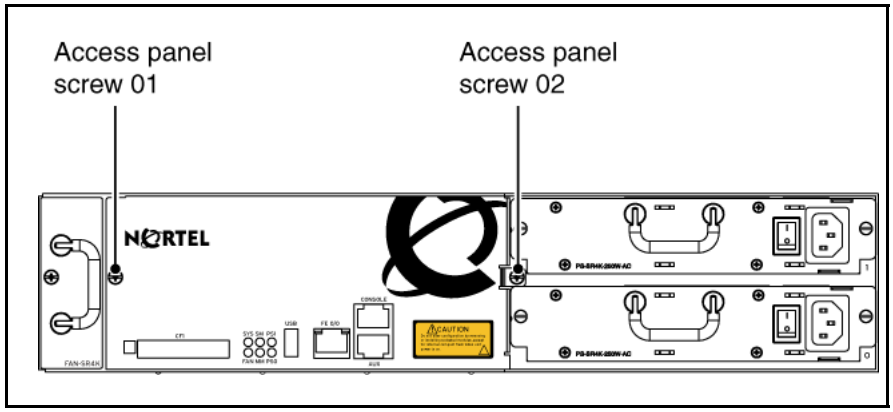
Use the procedure in this section to install an internal VPN/IPSec module. If you are replacing a VPN/IPSec module, also see "Removing the internal VPN/IPSec module" (page 74).

Prerequisites

- Ensure you have a VPN/IPSec module ready to install before opening the service access panel.
- Ensure you have a Phillips #2 screwdriver.
- Ensure the Secure Router 4134 has the power switched off.

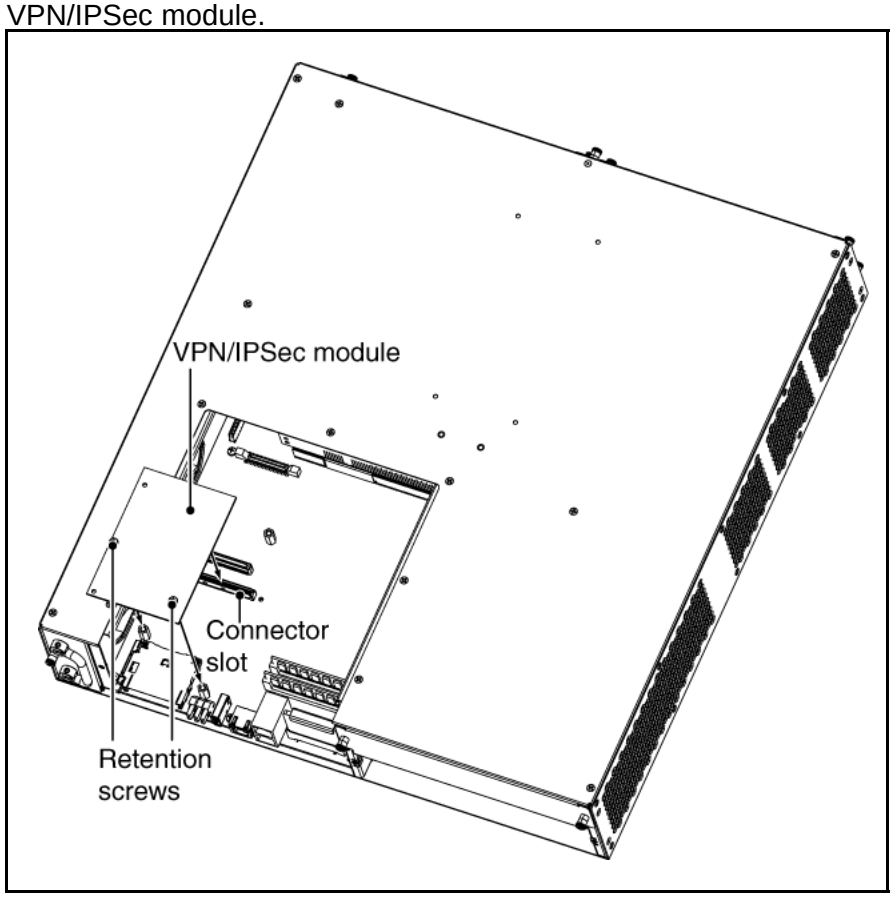
Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. Remove these two screws only. See the following figure.



2	Slowly slide the access panel toward you until it is clear of the Secure Router 4134.
3	Locate the internal VPN/IPSec module connector slot.
4	Holding the VPN/IPSec module by its edges, align the connector with the slot on the Main Board, pushing down gently, but firmly,

to seat the module.
The following figure shows the location for installing the VPN/IPSec module.



5 Using a Phillips screwdriver, tighten the two screws that secure the module to the Main Board.

--End--

Removing the internal VPN/IPSec module

Use the procedure in this section to remove a VPN/IPSec module from the Secure Router 4134.

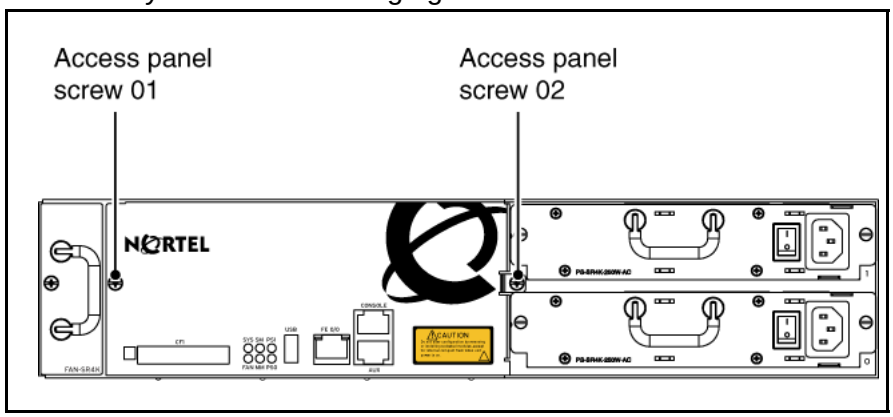
CAUTION
The internal VPN/IPSec module is not hot swappable. Do not open the Secure Router 4134 service access panel while the unit is powered.

Prerequisites

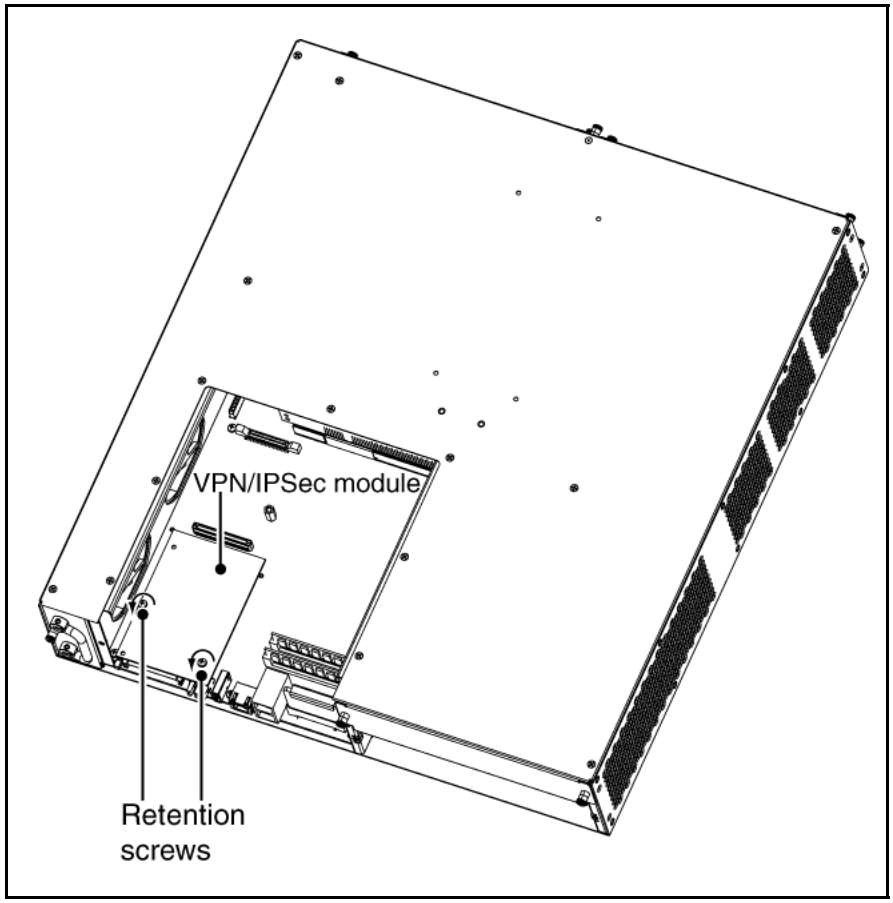
- Ensure you have a Phillips #2 screwdriver.
- Ensure the Secure Router 4134 has the power switched off.
- Ensure you have an antistatic bag or sheet available for the VPN/IPSec that you are removing.

Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. Remove these two screws only. See the following figure.



2	Slide the access panel toward you until it is clear of the Secure Router 4134.
3	Remove the two screws that secure the VPN/IPSec module to the Main Board (see the following figure).



4 Grasping the edges of the VPN/IPSec module, pull the module up and out of the slot in which it is seated.

5 If you are not installing a VPN/IPSec module at this time, replace the service access panel.

--End--

Installing or removing an internal PVM

Use the instructions in this section to install, remove, or replace the internal Packetized Voice Module (PVM). This internal module is not hot-swappable.

ATTENTION
You cannot enable the management port on the rear of the Secure Router 4134 (Ethernet 0/0) if you have a PVM installed (this is related to hardware design). Ensure you use Ethernet 0/1, 0/2, 0/3, or 0/4 for management if you use a PVM in the router.

If you ordered the PVM with your Secure Router 4134, the Secure Router ships with the PVM installed.

Average time to replace the internal PVM module: 2 minutes.

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

Installing the internal PVM

Use the procedure in this section to install an internal PVM. If you are replacing a PVM, also see “Removing the internal PVM” (page 80).

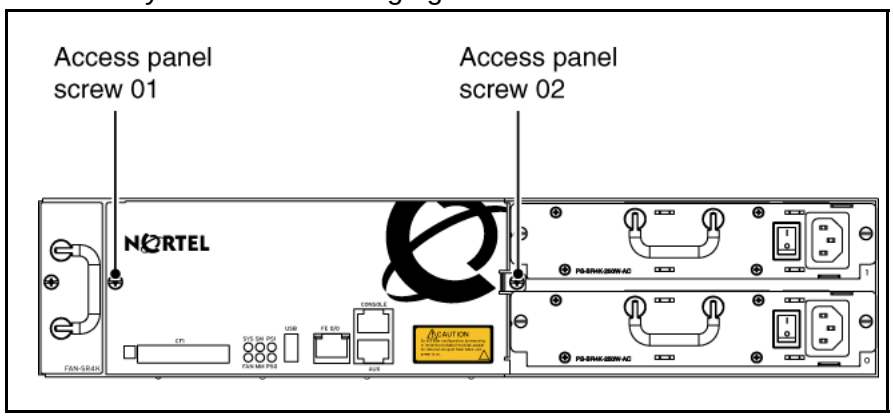
Average time to install the internal PVM module: 1 minute.

Prerequisites

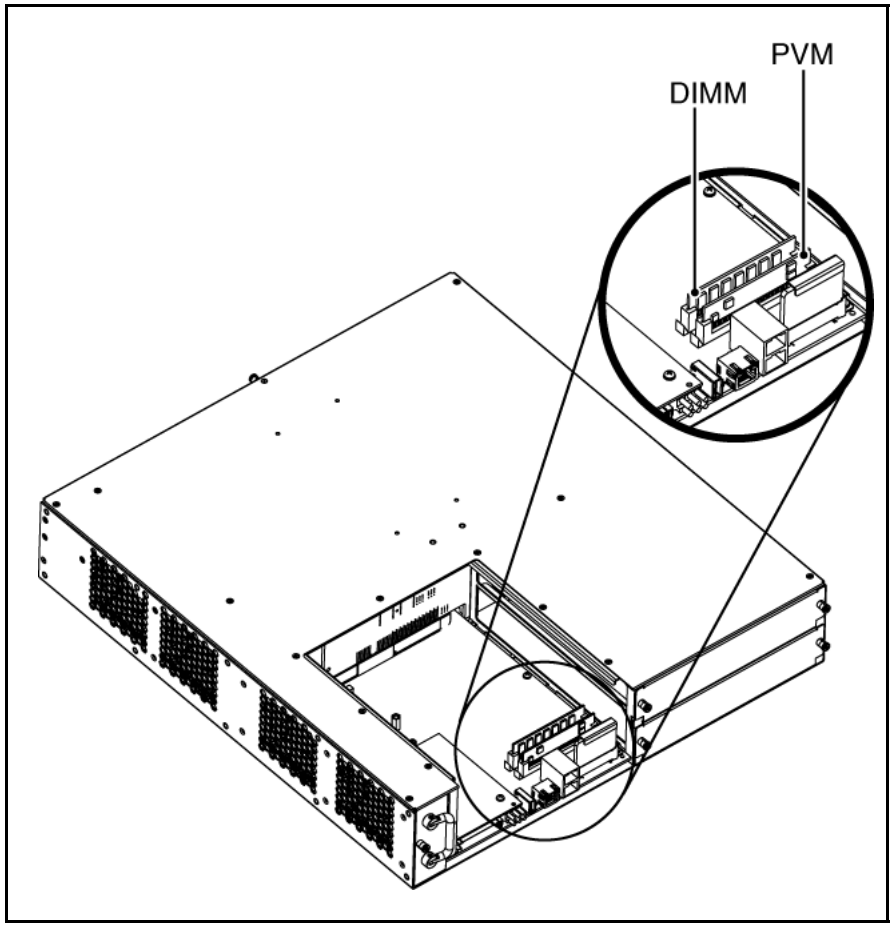
- Ensure the Secure Router 4134 has the power switched off.
- Ensure you have a PVM ready to install before opening the service access panel.
- Ensure you have a Phillips #2 screwdriver.

Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. Remove these two screws only. See the following figure.

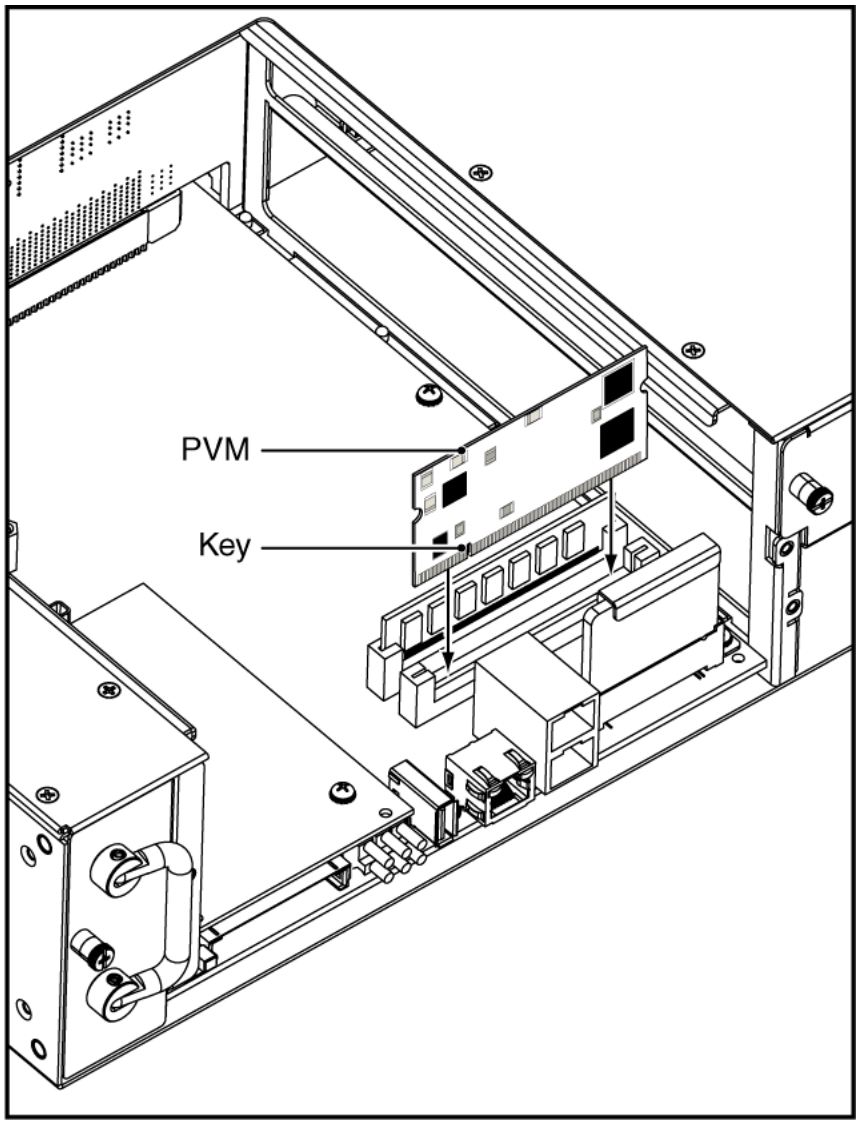


2	Slowly slide the access panel toward you until it is clear of the Secure Router 4134.
3	Locate the internal PVM connector slot. The following figure shows the location for installing the PVM.

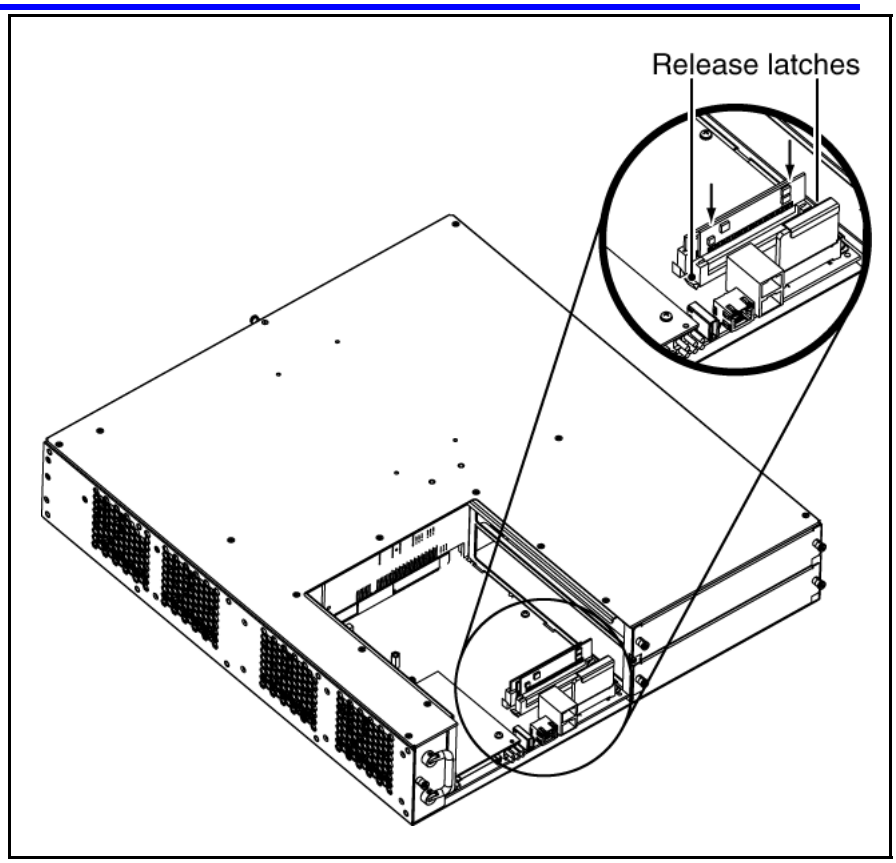


4 Ensure the PVM slot is clear of debris. Protective tape is placed over the SO-DIMM and PVM slots during the manufacturing process; remove this tape if it is present.

5 Holding the PVM by its edges, insert the module in the slot on the Main Board, pushing down gently, but firmly, to fully seat the module. The following figure shows the proper orientation of the PVM in relation to the slot. If you are looking at the rear of the router (with the service access panel removed), the key of the PVM is on the left side.



The release latches close when the PVM is properly installed. See the following figure.



6 Install the access panel onto the Secure Router 4134.

7 Install the two screws that secure the service access panel to the Secure Router 4134.

--End--

Removing the internal PVM

Use the procedure in this section to remove a PVM from the Secure Router 4134.

Average time to remove a PVM: 1 minute.

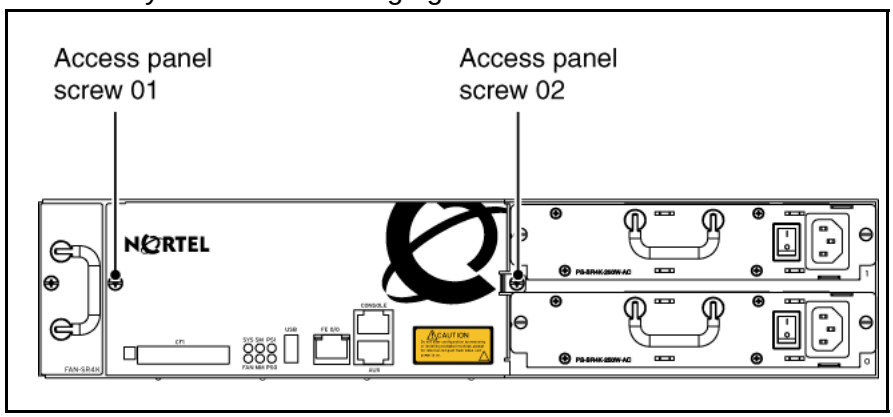
CAUTION
The internal PVM is not hot swappable. Do not open the Secure Router 4134 service access panel while the unit is powered.

Prerequisites

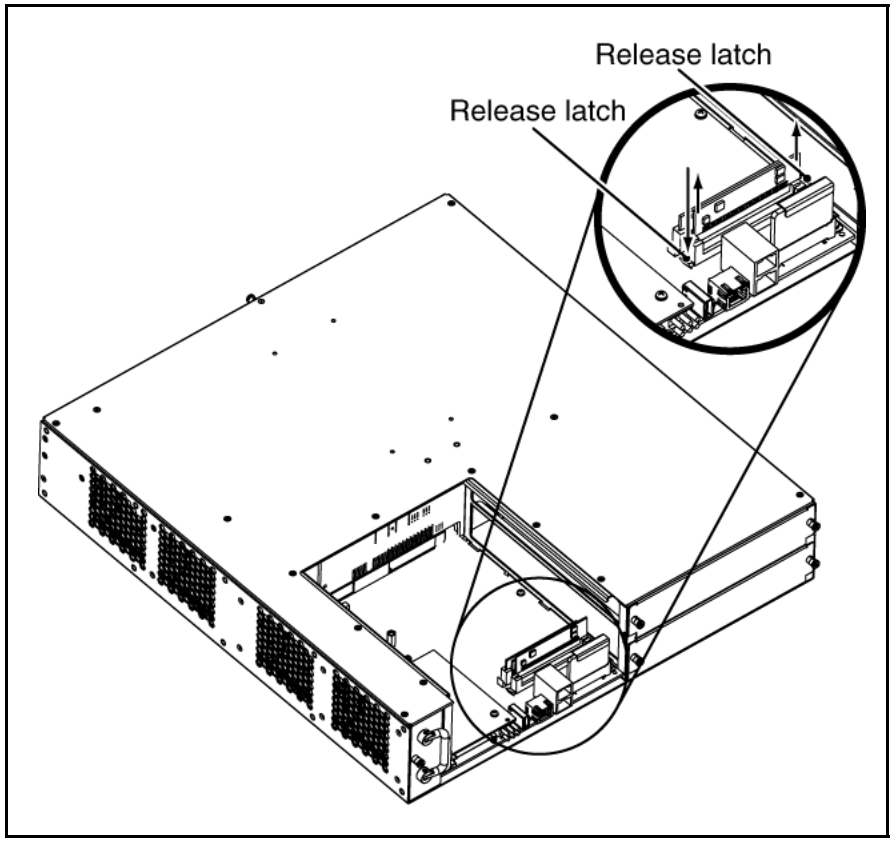
- Ensure the Secure Router 4134 has the power switched off.
- Ensure you have a Phillips #2 screwdriver.
- Ensure you have an antistatic bag or sheet available for the PVM that you are removing.

Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. Remove these two screws only. See the following figure.



2	Slide the access panel toward you until it is clear of the Secure Router 4134.
3	Locate the PVM.
4	Release the latches that secure the PVM in the slot. There is a release latch at both ends of the PVM slot. See the following figure.



5 Firmly grasp the edges of the PVM and pull straight up to remove the PVM from the slot.

6 If you are replacing a PVM, also see “Installing the internal PVM” (page 77).
If you are not installing a PVM at this time, replace the service access panel.

--End--

Replacing the DIMM in the Secure Router 4134

Use the instructions in this section if you must replace the DIMM. The DIMM is not hot-swappable.

Average time to replace a DIMM: 2 minutes.

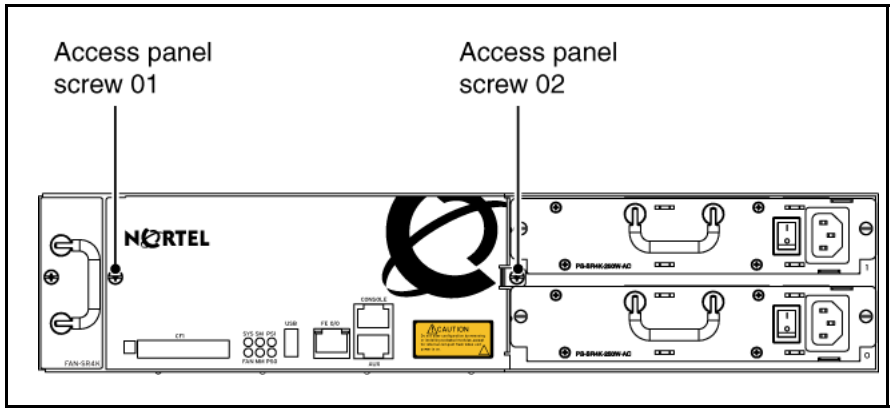
CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

Prerequisites

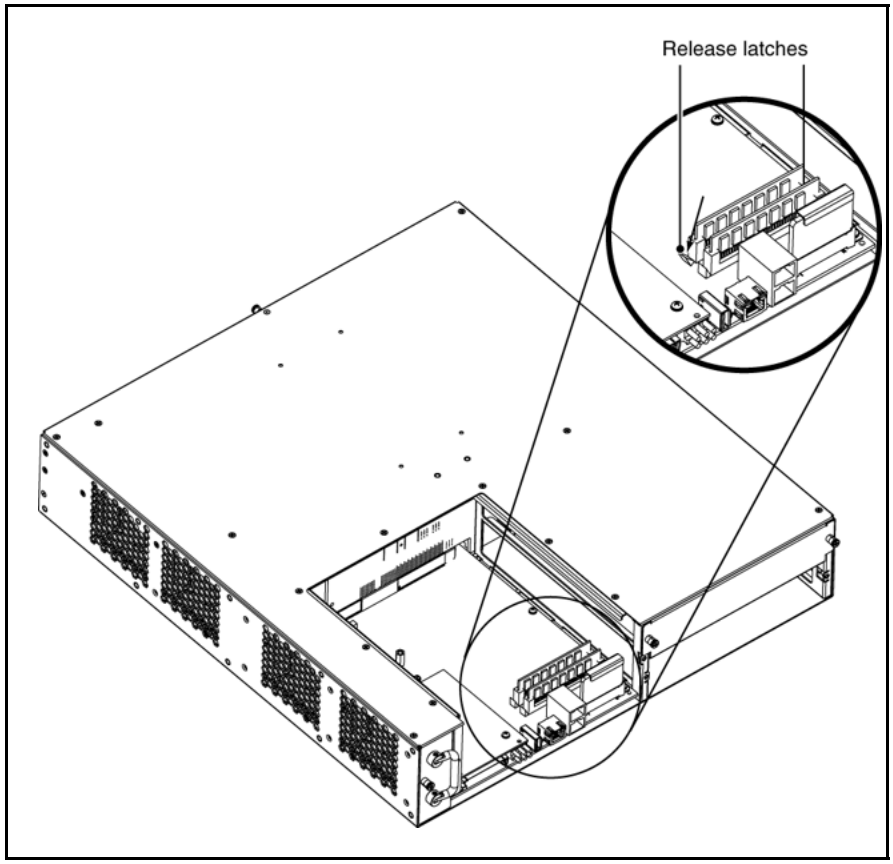
- Ensure the Secure Router 4134 is powered down.
- Ensure you have a replacement DIMM.
- Ensure you have a Phillips #2 screwdriver.

Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. The following figure shows the two screws that you must remove.



2	Slowly slide the access panel toward you until it is clear of the Secure Router 4134.
3	Locate the DIMM module.
4	Release the latches that secure the DIMM in the slot. There is a release latch at both ends of the DIMM slot. See the following figure.



5 Firmly grasp the DIMM by its edges and pull straight up to remove the DIMM from the slot.

6 Insert the replacement DIMM in the slot, pushing down firmly but gently to fully seat the DIMM in the slot.
The release latches close when the DIMM is properly installed.

--End--

Installing or removing the DIMM on the Mediation Server Module for OCS

Use the instructions in this section if you must install, remove, or replace a DIMM on the Mediation Server Module for OCS. The DIMM on the Mediation Server Module is not hot-swappable.

Average time to replace a DIMM on the Mediation Server Module: 4 minutes.

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

CAUTION
To prevent damage from electrostatic discharge, always wear an antistatic wrist strap connected to an electrostatic discharge (ESD) jack when performing maintenance on this product. Ensure that the wrist strap makes contact with your skin.

Installing a DIMM on the Mediation Server Module

Use the procedure in this section if you must install a DIMM on the Mediation Server Module.

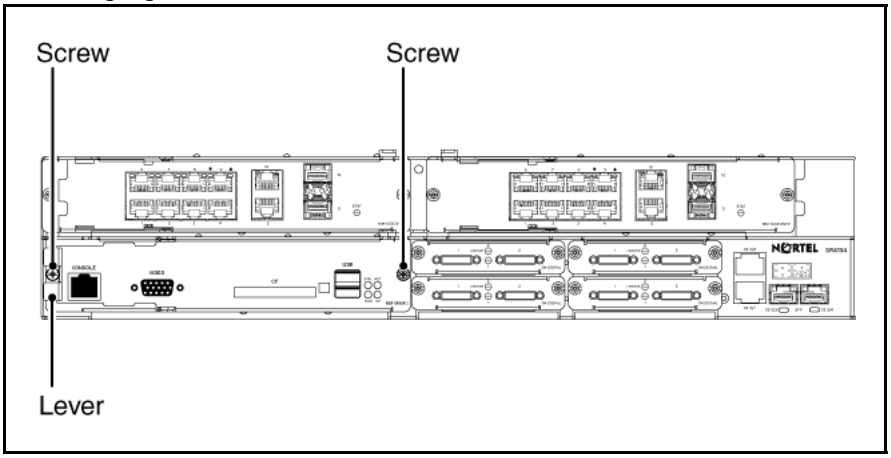
Average time to install a DIMM on the Mediation Server Module: 3 minutes.

Prerequisites

- Ensure the Secure Router 4134 is powered down.
- Ensure you have a Phillips #2 screwdriver.
- Ensure you have antistatic material available on which to lay the Mediation Server Module while you work.
- Ensure you have a DIMM ready to install before opening the service access panel.

Procedure steps

Step	Action
1	Using a Phillips screwdriver, loosen the two captive screws that secure the Mediation Server Module to the chassis. The following figure shows the screws.



2	Using the lever on the module, pull the module straight out of the chassis slot.

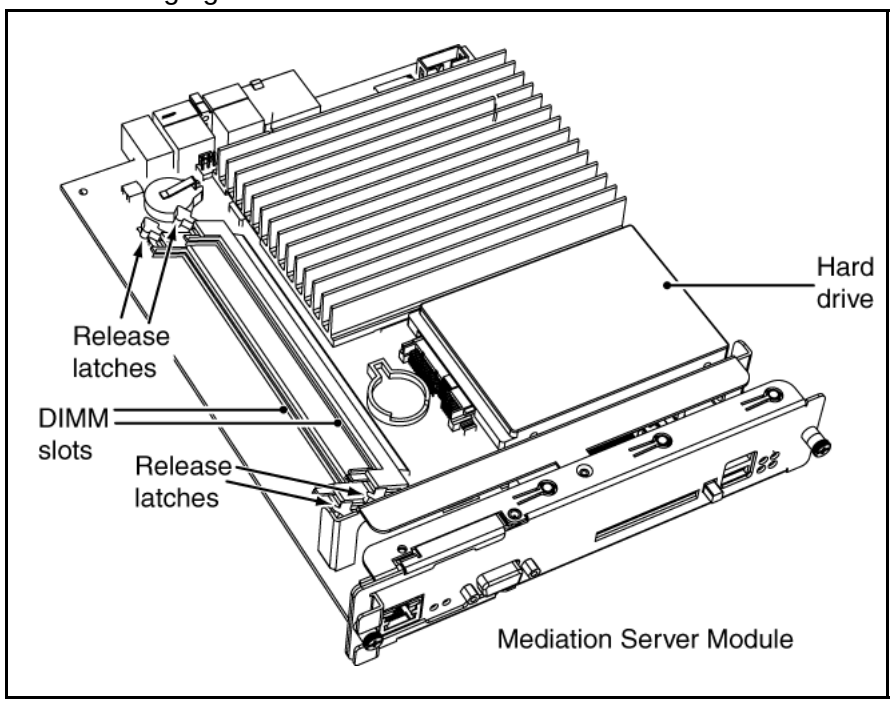
Support the module as you remove it from the chassis by grasping it by the edges.

3 Ensure you place the Mediation Server Module on antistatic material if you lay it down to install a DIMM.

Always hold the module by its edges.

4 Locate the DIMM slot on the module.

The following figure shows the DIMM slots.



5 If the release latches on each end of the DIMM slot are engaged, release the latches by pushing each latch away from the DIMM slot.

6 Insert the DIMM in the slot, pushing down firmly but gently to fully seat the DIMM in the slot.

The release latches close when the DIMM is properly installed.

7 Replace the Mediation Server Module in the chassis slot by aligning the module with the slot module guides.

8 Slide the module into the chassis until its connector panel touches the chassis back panel.

9 Push gently, but firmly, to seat the connector on the interface module in the chassis back panel.

10 Ensure the lever on the module is flush with the front panel of the Secure Router 4134.

11	Using a Phillips screwdriver, tighten the two captive screws to secure the module to the chassis.

--End--

Removing a DIMM from the Mediation Server Module

Use the procedure in this section if you must remove a DIMM from the Mediation Server Module.

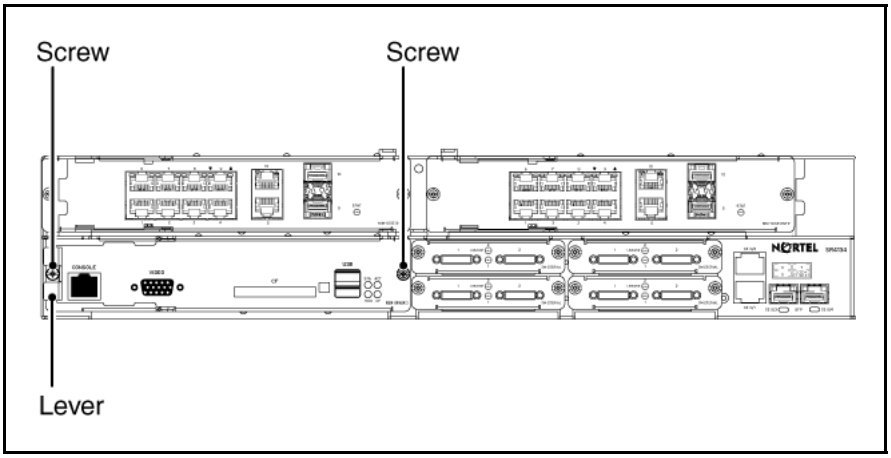
Average time to remove a DIMM from the Mediation Server Module: 3 minutes.

Prerequisites

- Ensure the Secure Router 4134 is powered down.
- Ensure you have a Phillips #2 screwdriver.
- Ensure you have an antistatic bag or sheet available for the DIMM that you are removing.

Procedure steps

Step	Action
1	Using a Phillips screwdriver, loosen the two captive screws that secure the Mediation Server Module to the chassis. The following figure shows the screws.



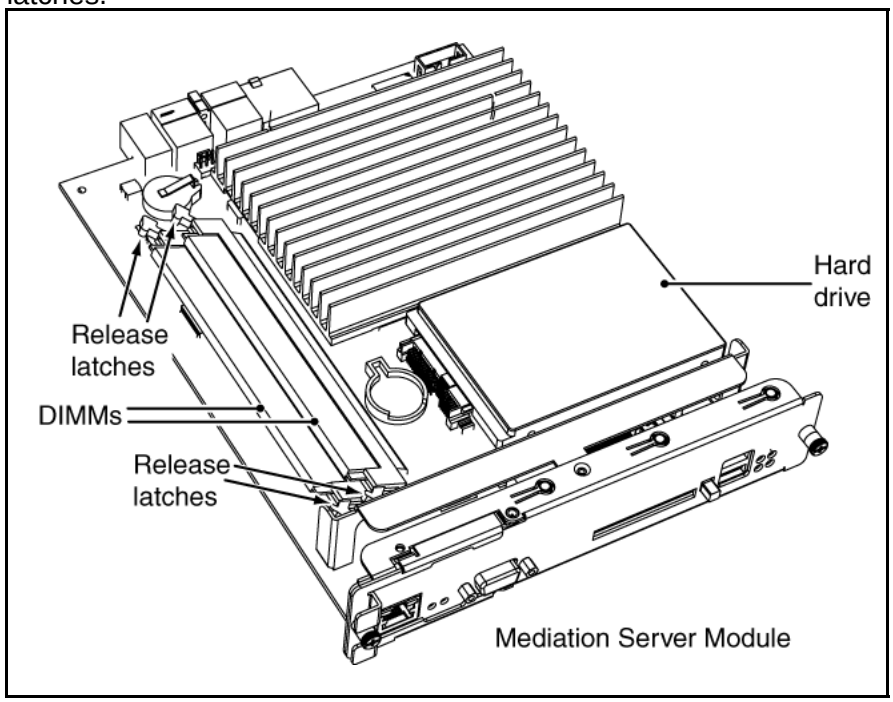
2	Using the lever on the module, pull the module straight out of the chassis slot. Support the module as you remove it from the chassis by grasping it by the edges.
3	Ensure you place the Mediation Server Module on antistatic material if you lay it down to install a DIMM.

Always hold the module by its edges.

4 Locate the DIMM to remove from the module.

5 Release the latches on each end of the DIMM slot.

The following figure shows the DIMM slots and the release latches.



6 Firmly grasp the DIMM by its edges and pull the DIMM from the slot.

7 If you are replacing the DIMM, also see "Installing a DIMM on the Mediation Server Module" (page 85).

If you are not installing a DIMM at this time, replace the module in the slot, or place a slot cover plate over the slot from which you removed the module. Store the Mediation Server Module in an antistatic bag until you are ready to install it in the chassis.

--End--

Replacing the internal Compact Flash

Use the instructions in this section if you must replace the internal Compact Flash. This internal device is not hot-swappable.

Average time to replace the internal Compact Flash: 1 minute

CAUTION
Do not open the Secure Router 4134 service access panel while the unit is powered.

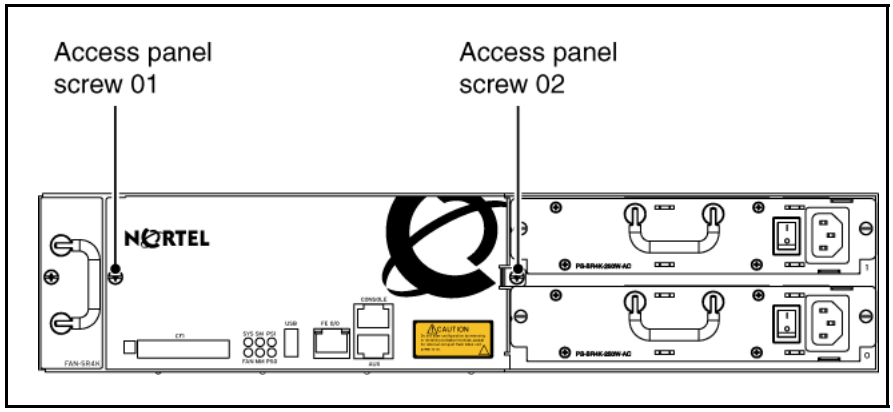
ATTENTION
The internal Compact Flash that ships with the Secure Router 4134 contains the system image.

Prerequisites

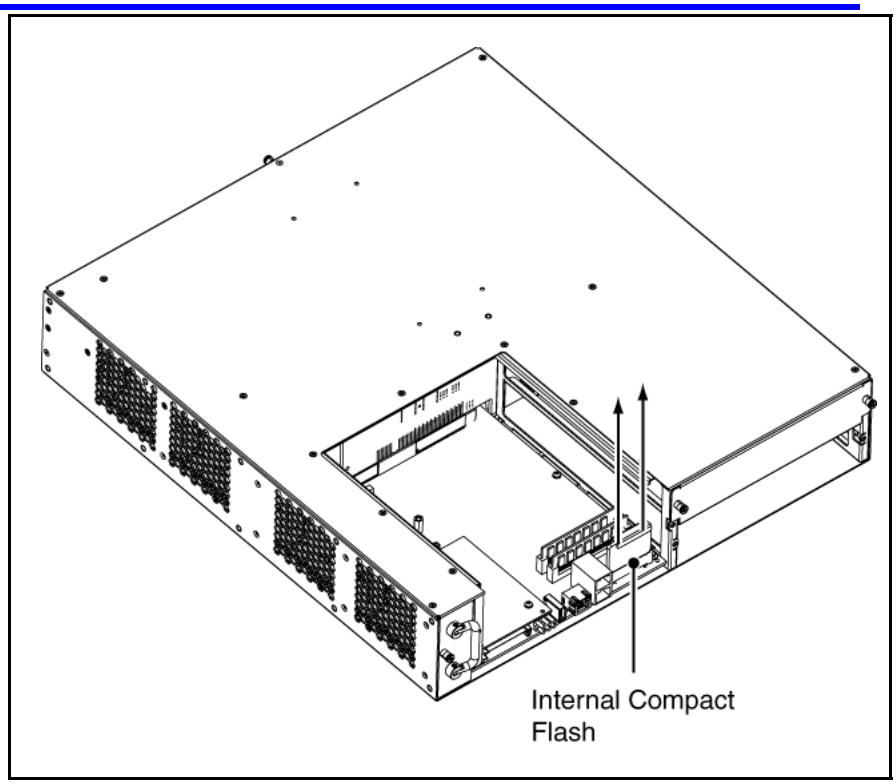
- Ensure you have a replacement Compact Flash ready to install.
- Ensure you have a Phillips #2 screwdriver.

Procedure steps

Step	Action
1	Remove the two screws at the rear of the Secure Router 4134 that hold the service access panel secure. The following figure shows the two screws that you must remove.



2	Slowly slide the access panel toward you until it is clear of the Secure Router 4134.
3	Locate the internal Compact Flash module.
4	Firmly grasp the Compact Flash by its edges and pull straight up to remove it from the slot. See the following figure.



5 Insert the replacement Compact Flash in the slot, pushing down firmly but gently to fully seat it in the slot.

--End--

Appendix Environmental requirements

The Secure Router 4134 must operate within the specified tolerance limits shown in the following table.

ATTENTION
Install the Secure Router 4134 in a restricted-access location. You must limit access to the Nortel Secure Router 4134 to authorized service personnel only. Ensure you allow 2 to 3 feet (0.61 to 0.91 m) of additional clearance around the Secure Router 4134 for access to the cable connectors on the front and rear panels.

Table 32
Environmental requirements

Parameter	Range
Operating temperature	0 to 40 C
Short-term temperature	–40 C to 70 C
Operating altitude	0–11 800 ft (0–3600 m)
Storage altitude	0–35 000 ft (0–11 000 m)
Operating humidity	0 to 90% R.H. (noncondensing)
Storage humidity	0 to 95% R.H. (noncondensing)
Vibration	Packaging and shipping – ISTA 2A Office Vibration – GR-63-CORE Issue 3, Section 4.4.2 and 5.4.2
Acoustic Noise	GR-63-CORE Issue 3, section 4.6 & 5.6

Appendix
Interface connector pin assignments

The following tables describe Secure Router 4134 interface connector pin assignments. SFP connector pin assignments are not listed because they are dependent on the specific SFP module that you install.

Pins that are not connected are reserved and should not be used.

Table 33
Console port pin assignments

Pin	Signal	Function	Direction
1	RTS	Control Signal output	Out
2	DTR	Control Signal output	Out
3	TXD	Transmit Data output	Out
4	DCD	Control Signal input	In
5	GND	Signal Ground	—
6	RXD	Receive Data input	In
7	DSR	Control Signal input	In
8	CTS	Control Signal input	In

Table 34
T1/E1 connector pin assignments

Pin	Signal	Direction	Description
1	RXRING	In	Receive Ring Signal
2	RXTIP	In	Receive TIP Signal
3	—	—	Unused
4	TXRING	Out	Transmit Ring Signal
5	TXTIP	Out	Transmit TIP Signal
6	—	—	Unused

Table 34
T1/E1 connector pin assignments (cont'd.)

Pin	Signal	Direction	Description
7	—	—	Unused
8	—	—	Unused

Table 35
ISDN S/T connector pin assignments

Pin	Signal	Direction	Description
1	—	—	Unused
2	—	—	Unused
3	Transmit +	Out	Differential output to line
4	Receive +	In	Differential input from line
5	Receive –	In	Differential input from line
6	Transmit –	Out	Differential output to line
7	—	—	Unused
8	—	—	Unused

Table 36
ISDN U connector pin assignments

Pin	Signal	Direction	Description
1	—	—	Unused
2	—	—	Unused
3	—	—	Unused
4	Signal	I/O	Tip or Ring to/from line
5	Signal	I/O	Tip or Ring to/from line
6	—	—	Unused
7	—	—	Unused
8	—	—	Unused

Table 37
FXO connector pin assignments (RJ11 interface)

Pin	Function
1	Not connected (N/C)

Table 37
FXO connector pin assignments (RJ11 interface) (cont'd.)

Pin	Function
2	N/C
3	Ring
4	Tip
5	N/C
6	N/C

Table 38
FXS connector pin assignments (RJ11 interface)

Pin	Function
1	N/C
2	N/C
3	Ring
4	Tip
5	N/C
6	N/C

Table 39
Serial connector pin assignments for DTE mode signal

Pin	Signal	Direc-tion	DTE mode signal					
			RS-232 V.10	RS-449 V.11	RS-530	RS-530A	V.35	X.21
1	TXD+	Out	TXD	SD+	TXD+	TXD+	SD+	T+
2	TXCE+	Out	TXCE	TT+	TXCE+	TXCE+	SCTE+	
3	TXC+	I/O	TXC	ST+	TXC+	TXC+	SCT+	
4	RXC+	In	RXC	RT+	RXC+	RXC+	SCR+	S+
5	RXD+	In	RXD	RD+	RXD+	RXD+	RD+	R+
6	DCD+	I/O	DCD	RR+	DCD+	DCD+	RLSD	
7	DTR+	Out	DTR	TR+	DTR+	DTR+	DTR	
8	RTS+	Out	RTS	RS+	RTS+	RTS+	RTS	C+
9	RTS–	Out		RS–	RTS–	RTS–		C–
10	CTS–	In		CS–	CTS–	CTS–		I–

Table 39
Serial connector pin assignments for DTE mode signal (cont'd.)

Pin	Signal	Direc-tion	DTE mode signal					
			RS-232 V.10	RS-449 V.11	RS-530	RS-530A	V.35	X.21
11	CTS+	In	CTS	CS+	CTS+	CTS+	CTS	I+
12	DSR+	In	DSR	DM+	DSR+	DSR+	DSR	
13	LL	I/O	LL	LL	LL	LL	LT	
14	TXD–	Out		SD–	TXD–	TXD–	SD–	T–
15	TXCE–	Out		TT–	TXCE–	TXCE–	SCTE–	
16	TXC–	I/O		ST–	TXC–	TXC–	SCT–	
17	RXC–	In		RT–	RXC–	RXC–	SCR–	S–
18	RXD–	In		RD–	RXD–	RXD–	RD–	R–
19	DCD–	I/O		RR–	DCD–	DCD–		
20	DTR–	Out		TR–	DTR–			
21	MODE2	In	Open	Open	GND	GND	Open	GND
22	MODE1	In	Open	GND	Open	GND	GND	Open
23	MODE0	In	GND	Open	GND	Open	GND	Open
24	MODE3	In	GND	GND	GND	GND	GND	GND
25	DSR–	In		DM–	DSR–			
26	GND	—	GND	GND	GND	GND	GND	GND

Table 40
Serial connector pin assignments for DCE mode signal

Pin	Signal	Direc-tion	DCE mode signal					
			RS-232 V.10	RS-449 V.11	RS-530	RS-530A	V.35	X.21
1	TXD+	Out	RXD	RD+	RXD+	RXD+	RD+	R+
2	TXCE+	Out	RXC	RT+	RXC+	RXC+	SCR+	S+
3	TXC+	I/O	TXC	ST+	TXC+	TXC+	SCT+	
4	RXC+	In	TXCE	TT+	TXCE+	TXCE+	SCTE+	
5	RXD+	In	TXD	SD+	TXD+	TXD+	TD+	T+
6	DCD+	I/O	DCD	RR+	DCD+	DCD+	RLSD	
7	DTR+	Out	DSR	DM+	DSR+	DSR+	DSR	

Table 40
Serial connector pin assignments for DCE mode signal (cont'd.)

Pin	Signal	Direc-tion	DCE mode signal					
			RS-232 V.10	RS-449 V.11	RS-530	RS-530A	V.35	X.21
8	RTS+	Out	CTS	CS+	CTS+	CTS+	CTS	I+
9	RTS–	Out		CS–	CTS–	CTS–		I–
10	CTS–	In		RS–	RTS–	RTS–		C–
11	CTS+	In	RTS	RS+	RTS+	RTS+	RTS	C+
12	DSR+	In	DTR	TR+	DTR+	DTR+	DTR	
13	LL	I/O	LL	LL	LL	LL	LT	
14	TXD–	Out		RD–	RXD–	RXD–	RD–	R–
15	TXCE–	Out		RT–	RXC–	RXC–	SCR–	S–
16	TXC–	I/O		ST–	TXC–	TXC–	SCT–	
17	RXC–	In		TT–	TXCE–	TXCE–	SCTE–	
18	RXD–	In		SD–	TXD–	TXD–	TD–	T–
19	DCD–	I/O		RR–	DCD–	DCD–		
20	DTR–	Out		DM–	DSR–	DSR–		
21	MODE2	In	Open	Open	GND	GND	Open	GND
22	MODE1	In	Open	GND	Open	GND	GND	Open
23	MODE0	In	GND	Open	GND	Open	GND	Open
24	MODE3	In	Open	Open	Open	Open	Open	Open
25	DSR–	In		TR–	DTR–	DTR–		
26	GND	—	GND	GND	GND	GND	GND	GND

Table 41
Serial connector cable type coding

Interface type	Connector mode pins			
	MODE3 (24)	MODE2 (21)	MODE1 (22)	MODE0 (23)
V.35 DTE	GND	Open	GND	GND
V.35 DCE	Open	Open	GND	GND
EIA–530 DTE	GND	GND	Open	GND
EIA–530 DCE	Open	GND	Open	GND
EIA–530A DTE	GND	GND	GND	Open
EIA–530A DCE	Open	GND	GND	Open
RS–449 DTE	GND	Open	GND	Open

Table 41
Serial connector cable type coding (cont'd.)

Interface type	Connector mode pins			
	MODE3 (24)	MODE2 (21)	MODE1 (22)	MODE0 (23)
RS–449 DCE	Open	Open	GND	Open
RS–232 DTE	GND	Open	Open	GND
RS–232 DCE	Open	Open	Open	GND
X.21 DTE	GND	GND	Open	Open
X.21 DCE	Open	GND	Open	Open

Table 42
HSSI connector pin assignments

Signal name	Positive pin	Negative pin	Direction	DTE signal name	DCE signal name
SG (Signal Ground)	1	26	—	—	—
RT (Receive Timing)	2	27	Input	RT	TT
CA (DCE Available)	3	28	Input	CA	TA
RD (Receive Data)	4	29	Input	RD	SD
LC (Loop–back C)	5	30	Input	LC	LA
ST (Send Timing)	6	31	Input	ST	—
SG (Signal Ground)	7	32	—	—	—
TA (DTE Available)	8	33	Output	TA	CA
TT (Terminal Timing)	9	34	Output	TT	RT
LA (Loop–back A)	10	35	Output	LA	LC
SD (Send Data)	11	36	Output	SD	RD
LB (Loop–back B)	12	37	Output	LB	TM
SG (Signal Ground)	13	38	—	—	—
Not Used	14–18	39-43	—	—	—
SG (Signal Ground)	19	44	—	—	—
Not Used	20–23	45-48	—	—	—
TM (Test Mode)	24	49	Input	TM	LB
SG (Signal Ground)	25	50	—	—	—

Table 43
DS3 BNC connector pin assignment

Pin	Signal	Description
Inner Cond.	TIP	Signal
Shield	RING	Return

Table 44
Fast Ethernet connector pin assignments

Pin	Signal	Function	Direction
1	Transmit +	Differential output to network	Out
2	Transmit –	Differential output to network	Out
3	Receive +	Differential input from network	In
4	Unused	Unused wire pair 1	–
5	Unused	Unused wire pair 1	–
6	Receive –	Differential input from network	In
7	Unused	Unused wire pair 2	–
8	Unused	Unused wire pair 2	–

Table 45
10/100/1000Base-T connector pin assignments

Pin	Signal (MDI)	Signal (MDI–X)	Description
1	BI_DA+	BI_DB+	Data Pair 1 +
2	BI_DA–	BI_DB–	Data Pair 1 –
3	BI_DB+	BI_DA+	Data Pair 2 +
4	BI_DC+	BI_DD+	Data Pair 3 +
5	BI_DC–	BI_DD–	Data Pair 3 –
6	BI_DB–	BI_DA–	Data Pair 2 –
7	BI_DD+	BI_DC+	Data Pair 4 +
8	BI_DD–	BI_DC–	Data Pair 4 –

Appendix
Serial cable descriptions

Use this section for specification information about the serial cables available for the Secure Router 4134.

DTE V.35 serial cable

Order code: SR0018011E6

Figure 29
DTE V.35 serial cable

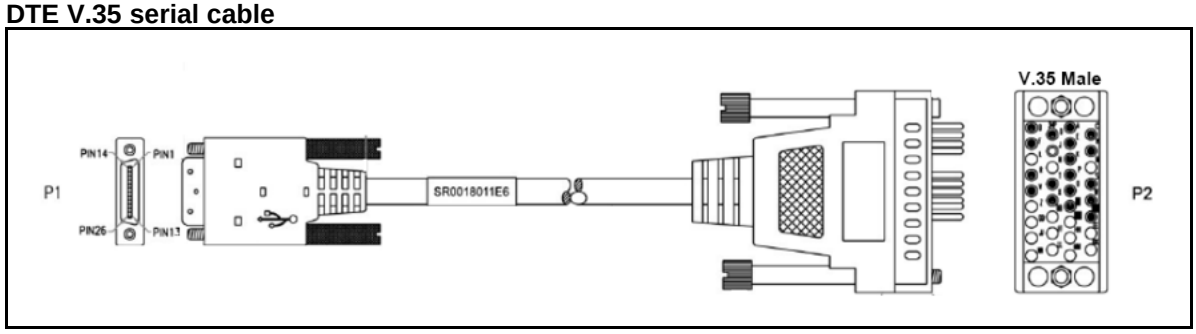


Table 46
DTE V.35 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	SD+ SD–	P S
2 15	TXCE+ TXCE–	Twisted pair	→ →	SCTE+ SCTE–	U W
3 16	TXC+ TXC–	Twisted pair	← ←	SCT+ SCT–	Y AA
4 17	RXC+ RXC–	Twisted pair	← ←	SCR+ SCR–	V X
5 18	RXD+ RXD–	Twisted pair	← ←	RD+ RD–	R T

Table 46
DTE V.35 serial cable description (cont'd.)

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
6 19	DCD+ DCD–	Twisted pair	← ←	RLSD GND	F B
7 8	DTR+ RTS+	Twisted pair	→ →	DTR RTS	H C
11 12	CTS+ DSR+	Twisted pair	← ←	CTS DSR	D E
13 26	LL GND	Twisted pair	→ —	LT GND	K B
Shield	Shield		—	Shield	A
9	RTS–	No connect			
10	CTS–	No connect			
20	DTR–	No connect			
21	MODE2	No connect			
22	MODE1	GND			
23	MODE0	GND			
24	MODE3	GND			
25	DSR–	No connect			

DCE V.35 serial cable

Order code: SR0018012E6

Figure 30
DCE V.35 serial cable

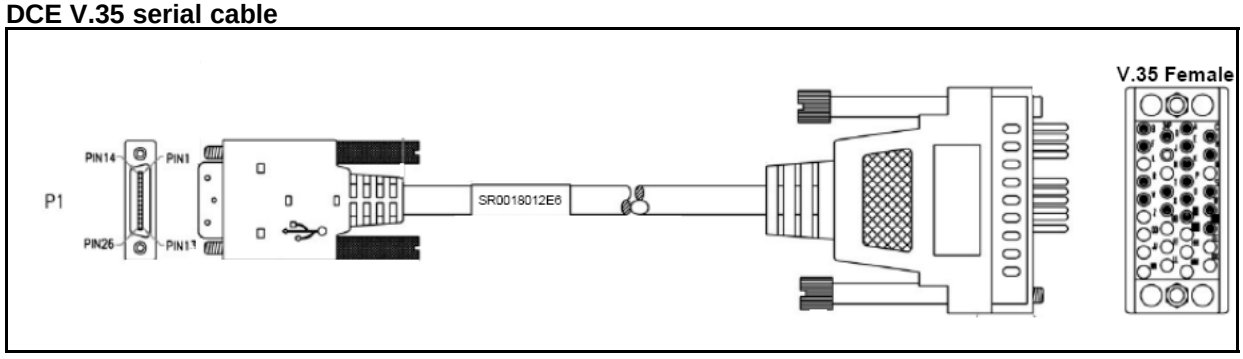


Table 47
DCE V.35 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	RD+ RD–	R T
2 15	TXCE+ TXCE–	Twisted pair	→ →	SCR+ SCR–	V X
3 16	TXC+ TXC–	Twisted pair	→ →	SCT+ SCT–	Y AA
4 17	RXC+ RXC–	Twisted pair	← ←	SCTE+ SCTE–	U W
5 18	RXD+ RXD–	Twisted pair	← ←	SD+ SD–	P S
6 19	DCD+ DCD–	Twisted pair	→ →	RLSD GND	F B
7 8	DTR+ RTS+	Twisted pair	→ →	DSR CTS	E D
11 12	CTS+ DSR+	Twisted pair	← ←	RTS DTR	C H
13 26	LL GND	Twisted pair	← —	LT GND	K B
Shield	Shield		—	Shield	A Shield
9	RTS–	No connect			
10	CTS–	No connect			
20	DTR–	No connect			
21	MODE2	No connect			
22	MODE1	GND			
23	MODE0	GND			
24	MODE3	No connect			
25	DSR–	No connect			

DTE X.21 serial cable

Order code: SR0018013E6

Figure 31
DTE X.21 serial cable

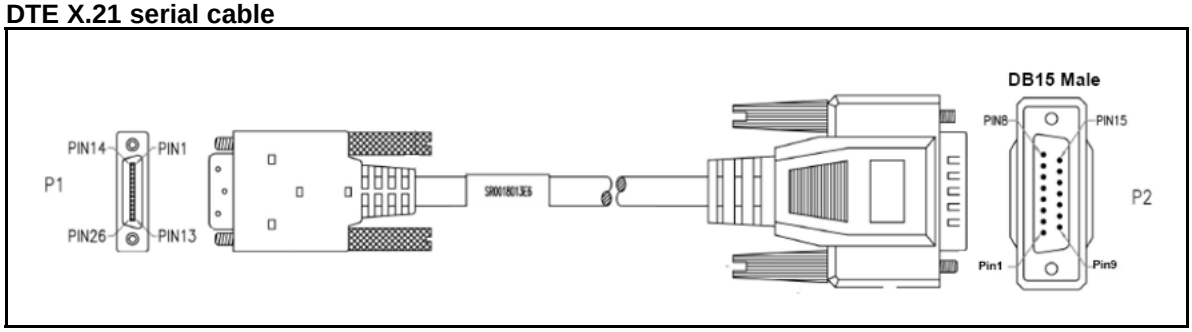


Table 48
DTE X.21 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	T+ T–	2 9
4 17	RXC+ RXC–	Twisted pair	← ←	S+ S–	6 13
5 18	RXD+ RXD–	Twisted pair	← ←	R+ R–	4 11
8 9	RTS+ RTS–	Twisted pair	→ →	C+ C–	3 10
11 10	CTS+ CTS–	Twisted pair	← ←	I+ I–	5 12
26 Shield	GND		—	GND	1 8 Shield
2	TXCE+	No connect			
3	TXC+	No connect			
6	DCD+	No connect			
7	DTR+	No connect			
12	DSR+	No connect			
13	LL	No connect			
15	TXCE–	No connect			
16	TXC–	No connect			
19	DCD–	No connect			
20	DTR–	No connect			
21	MODE2	GND			
22	MODE1	No connect			

Table 48
DTE X.21 serial cable description (cont'd.)

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
23	MODE0	No connect			
24	MODE3	GND			
25	DSR–	No connect			

DCE X.21 serial cable

Order code: SR0018014E6

Figure 32
DCE X.21 serial cable

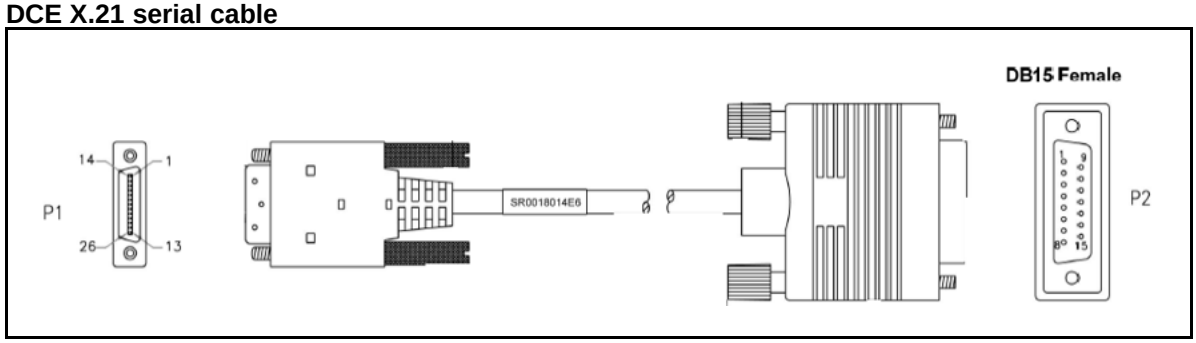


Table 49
DCE X.21 serial cable description

Pin 1	P1 signal	Note	Direction	P2 signal	Pin 2
1 14	TXD+ TXD–	Twisted pair	→ →	R+ R–	4 11
2 15	TXCE+ TXCE–	Twisted pair	→ →	S+ S–	6 13
5 18	RXD+ RXD–	Twisted pair	← ←	T+ T–	2 9
8 9	RTS+ RTS–	Twisted pair	→ →	I+ I–	5 12
11 10	CTS+ CTS–	Twisted pair	← ←	C+ C–	3 10
26 Shield	GND		—	GND	1 8 Shield

Table 49
DCE X.21 serial cable description (cont'd.)

Pin 1	P1 signal	Note	Direction	P2 signal	Pin 2
3	TXC+	No connect			
4	RXC+	No connect			
6	DCD+	No connect			
7	DTR+	No connect			
12	DSR+	No connect			
13	LL	No connect			
16	TXC–	No connect			
17	RXC–	No connect			
19	DCD–	No connect			
20	DTR–	No connect			
21	MODE2	GND			
22	MODE1	No connect			
23	MODE0	No connect			
24	MODE3	No connect			
25	DSR–	No connect			

DTE RS-449 serial cable

Order code: SR0018015E6

Figure 33
DTE RS-449 serial cable

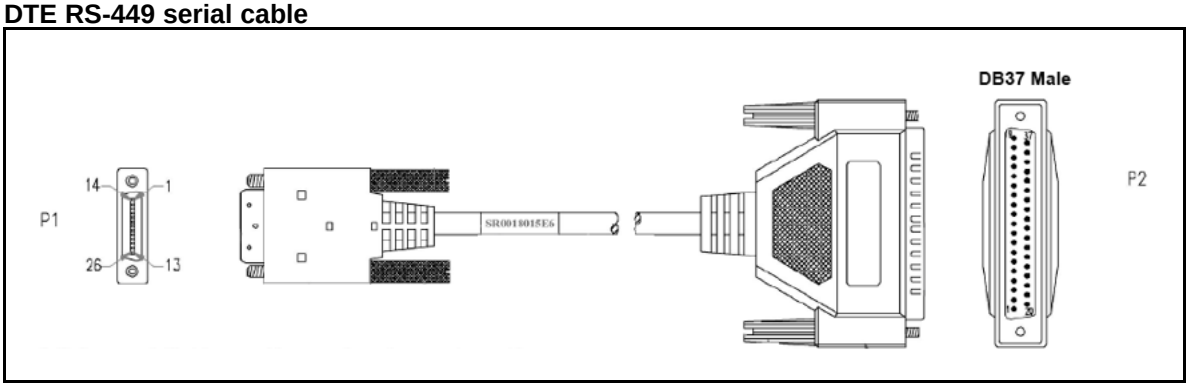


Table 50
DTE RS-449 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	SD+ SD–	4 22
2 15	TXCE+ TXCE–	Twisted pair	→ →	TT+ TT–	17 35
3 16	TXC+ TXC–	Twisted pair	← ←	ST+ ST–	5 23
4 17	RXC+ RXC–	Twisted pair	← ←	RT+ RT–	8 26
5 18	RXD+ RXD–	Twisted pair	← ←	RD+ RD–	6 24
6 19	DCD+ DCD–	Twisted pair	← ←	RR+ RR–	13 31
7 20	DTR+ DTR–	Twisted pair	→ →	TR+ TR–	12 30
8 9	RTS+ RTS–	Twisted pair	→ →	RS+ RS–	7 25
10 11	CTS– CTS+	Twisted pair	← ←	CS– CS+	27 9
12 25	DSR+ DSR–	Twisted pair	← ←	DM+ DM–	11 29
13 26	LL GND	Twisted pair	→ —	LL GND	10 19, 20, 37
Shield	Shield		—	Shield	1 Shield
21	MODE2	No connect			
22	MODE1	GND			
23	MODE0	No connect			
24	MODE3	GND			

DCE RS-449 serial cable

Order code: SR0018016E6

Figure 34
DCE RS-449 serial cable

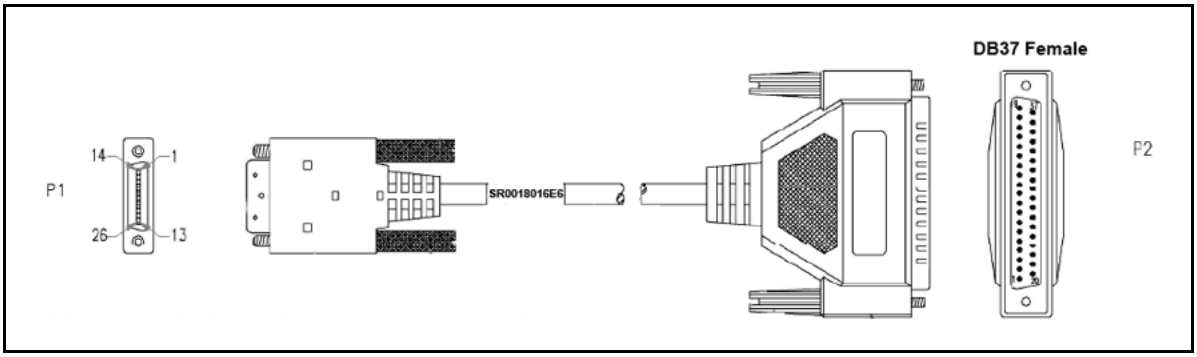


Table 51
DCE RS-449 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	RD+ RD–	6 24
2 15	TXCE+ TXCE–	Twisted pair	→ →	RT+ RT–	8 26
3 16	TXC+ TXC–	Twisted pair	→ →	ST+ ST–	5 23
4 17	RXC+ RXC–	Twisted pair	← ←	TT+ TT–	17 35
5 18	RXD+ RXD–	Twisted pair	← ←	SD+ SD–	4 22
6 19	DCD+ DCD–	Twisted pair	→ →	RR+ RR–	13 31
7 20	DTR+ DTR–	Twisted pair	→ →	DM+ DM–	11 29
8 9	RTS+ RTS–	Twisted pair	→ →	CS+ CS–	9 27
10 11	CTS– CTS+	Twisted pair	← ←	RS– RS+	25 7
12 25	DSR+ DSR–	Twisted pair	← ←	TR+ TR–	12 30
13 26	LL GND	Twisted pair	→ —	LL GND	10 19, 20, 37
Shield	Shield		—	Shield	1 Shield

Table 51
DCE RS-449 serial cable description (cont'd.)

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
21	MODE2	No connect			
22	MODE1	GND			
23	MODE0	No connect			
24	MODE3	No connect			

DTE RS-232 serial cable

Order code: SR0018017E6

Figure 35
DTE RS-232 serial cable

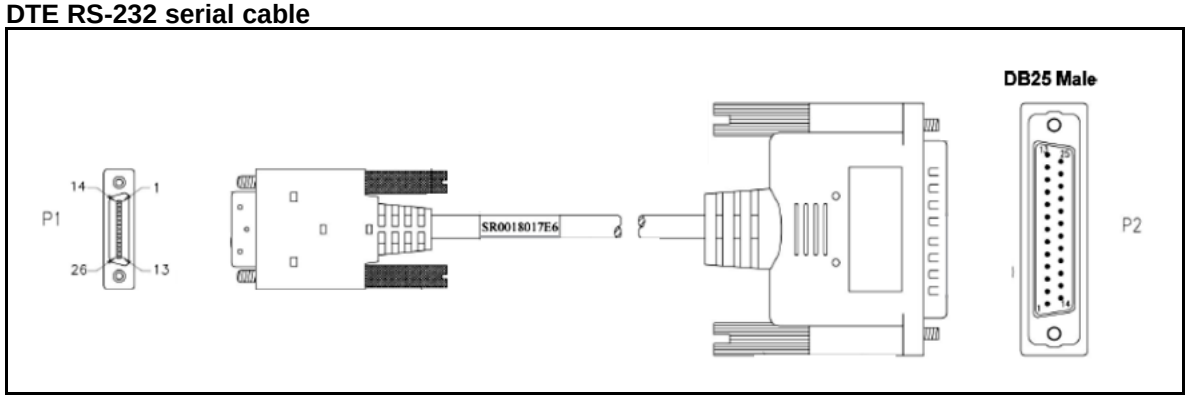


Table 52
DTE RS-232 serial cable description

P1 pin	P1 signal	Direction	P2 signal	P2 pin
1	TXD+	→	TXD	2
2	TXCE+	→	TXCE	24
3	TXC+	←	TXC	15
4	RXC+	←	RXC	17
5	RXD+	←	RXD	3
6	DCD+	←	DCD	8
7	DTR+	→	DTR	20
8	RTS+	→	RTS	4
11	CTS+	←	CTS	5
12	DSR+	←	DSR	6
13	LL	→	LL	18

Table 52
DTE RS-232 serial cable description (cont'd.)

P1 pin	P1 signal	Direction	P2 signal	P2 pin
26	GND	—	GND	7
Shield	Shield	—	Shield	1 Shield
9	RTS–	No connect		
10	CTS–	No connect		
14	TXD–	No connect		
15	TXCE–	No connect		
16	TXC–	No connect		
17	RXC–	No connect		
18	RXD–	No connect		
19	DCD–	No connect		
20	DTR–	No connect		
25	DSR–	No connect		
21	MODE2	No connect		
22	MODE1	No connect		
23	MODE0	GND		
24	MODE3	GND		

DCE RS-232 serial cable

Order code: SR0018018E6

Figure 36
DCE RS-232 serial cable

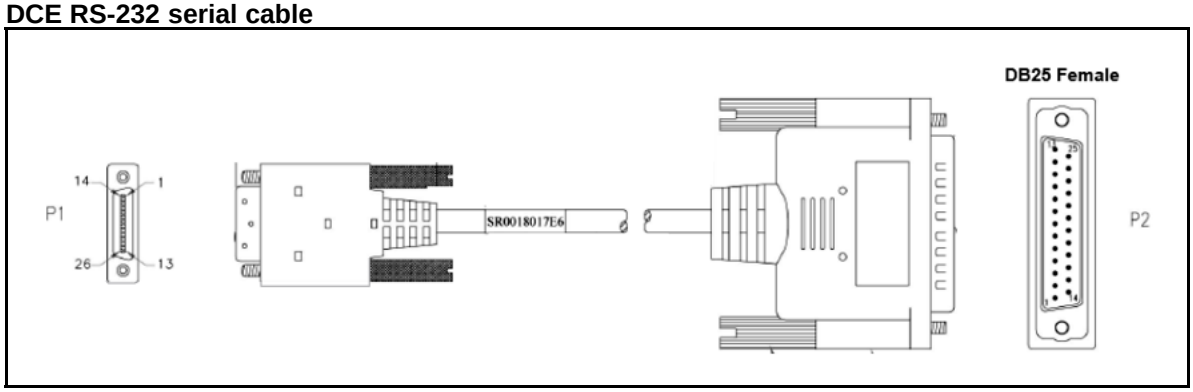


Table 53
DCE RS-232 serial cable description

P1 pin	P1 signal	Direction	P2 signal	P2 pin
1	TXD+	→	RXD	3
2	TXCE+	→	RXC	17
3	TXC+	→	TXC	15
4	RXC+	←	TXCE	24
5	RXD+	←	TXD	2
6	DCD+	→	DCD	8
7	DTR+	→	DSR	6
8	RTS+	→	CTS	5
11	CTS+	←	RTS	4
12	DSR+	←	DTR	20
13	LL	←	LTST	18
26	GND	—	GND	7
Shield	Shield	—	Shield	1 Shield
9	RTS–	No connect		
10	CTS–	No connect		
14	TXD–	No connect		
15	TXCE–	No connect		
16	TXC–	No connect		
17	RXC–	No connect		
18	RXD–	No connect		
19	DCD–	No connect		
20	DTR–	No connect		
25	DSR–	No connect		
21	MODE2	No connect		
22	MODE1	No connect		
23	MODE0	GND		
24	MODE3	No connect		

DTE RS-530 serial cable

Order code: SR0018019E6

Figure 37
DTE RS-530 serial cable

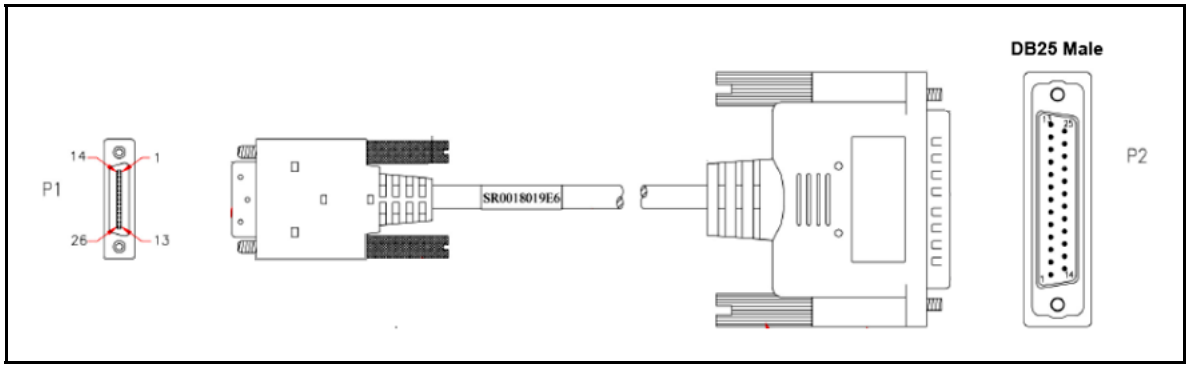


Table 54
DTE RS-530 serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	SD+ SD–	2 14
2 15	TXCE+ TXCE–	Twisted pair	→ →	TT+ TT–	24 11
3 16	TXC+ TXC–	Twisted pair	← ←	ST+ ST–	15 12
4 17	RXC+ RXC–	Twisted pair	← ←	RT+ RT–	17 9
5 18	RXD+ RXD–	Twisted pair	← ←	RD+ RD–	3 16
6 19	DCD+ DCD–	Twisted pair	← ←	RR+ RR–	8 10
7 20	DTR+ DTR–	Twisted pair	→ →	TR+ TR–	20 23
8 9	RTS+ RTS–	Twisted pair	→ →	RS+ RS–	4 19
10 11	CTS– CTS+	Twisted pair	← ←	CS– CS+	13 5
12 25	DSR+ DSR–	Twisted pair	← ←	DM+ DM–	6 22
13 26	LL GND	Twisted pair	→ —	LL GND	18 7
Shield	Shield		—	Shield	1 Shield

Table 54
DTE RS-530 serial cable description (cont'd.)

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
21	MODE2	GND			
22	MODE1	No connect			
23	MODE0	GND			
24	MODE3	GND			

DTE RS-530A serial cable

Order code: SR0018020E6

Figure 38
DTE RS-530A serial cable

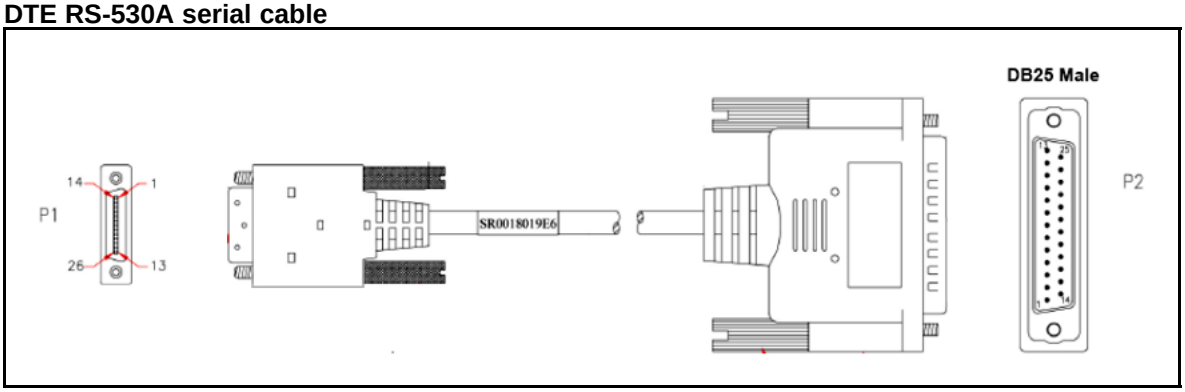


Table 55
DTE RS-530A serial cable description

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
1 14	TXD+ TXD–	Twisted pair	→ →	SD+ SD–	2 14
2 15	TXCE+ TXCE–	Twisted pair	→ →	TT+ TT–	24 11
3 16	TXC+ TXC–	Twisted pair	← ←	ST+ ST–	15 12
4 17	RXC+ RXC–	Twisted pair	← ←	RT+ RT–	17 9
5 18	RXD+ RXD–	Twisted pair	← ←	RD+ RD–	3 16
6 19	DCD+ DCD–	Twisted pair	← ←	RR+ RR–	8 10
7	DTR+		→	TR+	20

Table 55
DTE RS-530A serial cable description (cont'd.)

P1 pin	P1 signal	Note	Direction	P2 signal	P2 pin
8 9	RTS+ RTS–	Twisted pair	→ →	RS+ RS–	4 19
10 11	CTS– CTS+	Twisted pair	← ←	CS– CS+	13 5
12	DSR+		←	DM+	6
13 26	LL GND	Twisted pair	→ —	LL GND	18 7
Shield	Shield		—	Shield	1 Shield
20	DTR–	No connect			
21	MODE2	GND			
22	MODE1	GND			
23	MODE0	No connect			
24	MODE3	GND			
25	DSR–	No connect			

Appendix Hardware reliability

This section provides information about the reliability of the Secure Router 4134 hardware. This section uses the following terms:

- failures in time (FIT)—The number of failures for each billion (10^9) accumulated device hours.
- mean time between failures (MTBF)—The average value of the time intervals between successive outages of the system. This average value is calculated from, and based on, a large population of nominally identical items.

The following table provides information for the expected reliability of Secure Router 4134 hardware in terms of FIT and MTBF.

ATTENTION
Ensure you install the Secure Router 4134 and its components correctly and operate the unit within the intended environment under specified conditions. The failure rate and MTBF values in the following table do not include failure caused by software or erroneous human action.

Table 56
Secure Router 4134 reliability

Hardware	Failure rate	MTBF
Main board	5 107 FITs	195 780 hours
VPN	515 FITs	1 940 558 hours
Fan tray module	8 208 FITs	121 829 hours
Non-PoE 250 W AC power supply module	2 181 FITs	458 377 hours
PoE 660 W AC power supply module	8 460 FITs	118 191 hours
250 W DC power supply module	1 389 FITs	719 672 hours

Table 56
Secure Router 4134 reliability (cont'd.)

Hardware	Failure rate	MTBF
1-port T1/E1 Small Module	370 FITs	2 702 372 hours
2-port T1/E1 Small Module	484 FITs	2 062 556 hours
2-port ISDN BRI ST Small Module	582 FITs	1 717 202 hours
2-port ISDN BRI U Small Module	564 FITs	1 771 934 hours
1-port Serial Small Module	402 FITs	2 485 181 hours
2-port Serial Small Module	492 FITs	2 031 508 hours
1-port HSSI Medium Module	1 067 FITs	936 771 hours
1-port CT3 Medium Module	902 FITs	1 108 211 hours
1-port DS3 Medium Module	902 FITs	1 108 211 hours
8-port T1/E1 Medium Module	1 241 FITs	805 519 hours
10-port Gigabit Ethernet (GbE) Medium Module	3 407 FITs	293 439 hours
24-port Fast Ethernet (FE) Medium Module	4 841 FITs	206 542 hours
24-port Fast Ethernet/Power over Ethernet (FE/PoE) Medium Module	5 068 FITs	197 288 hours
44-port GbE Large Module	4 771 FITs	209 577 hours

Battery life expectancy on the Mediation Server Module for OCS

The Mediation Server Module ships with a battery installed. The typical life expectancy of the 170 mAh battery (VARTA CR2025) is 5–6 years assuming an average "on" time of 8 hours for each working day at an operating temperature of 30°C. However, this value varies considerably because the life expectancy is dependent on the operating temperature and the standby time (shutdown time) of the system in which the battery operates. To ensure that the lifetime of the battery is not exceeded, Nortel recommends that you exchange the battery every 4–5 years.

Appendix
Translations of safety messages

Class A device caution statement

CAUTION
This device is a Class A product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users are required to take appropriate measures necessary to correct the interference at their own expense.

CAUTION
ACHTUNG
Dies ist ein Gerät der Klasse A. Bei Einsatz des Geräts in Wohngebieten kann es Störungen des Radio- und Fernsehempfangs verursachen. In diesem Fall muss der Benutzer alle notwendigen Maßnahmen ergreifen, die möglicherweise nötig sind, um die Störungen auf eigene Rechnung zu beheben.

CAUTION
PRECAUCIÓN
Este es un producto clase A. El uso de este equipo en áreas residenciales puede causar interferencias nocivas, en cuyo caso, se requerirá que los usuarios tomen cualquier medida necesaria para corregir la interferencia por cuenta propia.

CAUTION
ATTENTION
Le périphérique est un produit de Classe A. Le fonctionnement de cet équipement dans une zone résidentielle risque de causer des interférences nuisibles, auquel cas l'utilisateur devra y remédier à ses propres frais.

CAUTION
CUIDADO
Este dispositivo é um produto Classe A. Operar este equipamento em uma área residencial provavelmente causará interferência prejudicial; neste caso, espera-se que os usuários tomem as medidas necessárias para corrigir a interferência por sua própria conta.

CAUTION
ATTENZIONE
Questo dispositivo è un prodotto di Classe A. Il funzionamento di questo apparecchio in aree residenziali potrebbe causare interferenze dannose, nel cui caso agli utenti verrà richiesto di adottare tutte le misure necessarie per porre rimedio alle interferenze a proprie spese.

注意：この機器は、クラスAの製品です。国内の環境で、この機器は電波障害を引き起こす恐れがあります。この場合、ユーザは適切な対策を講じる必要があります。

注意：本设备属于A类设备。在居住环境中，本设备可能会造成无线电干扰。在这种情况下，用户可能需要采取适当的措施。

警告: 该设备是 A 类产品。在住宅区内使用该设备可能会产生射频干扰，此时用户应采取相应的措施。

Qualified service personnel warning statement

WARNING
Only qualified service personnel must perform the installation. Read and follow all warning notices and instructions marked on the product or included in the documentation.

WARNING
WARNUNG
Nur qualifiziertes Wartungspersonal darf die Installation vornehmen. Lesen und befolgen Sie die Warnungshinweise und Anweisungen, die auf dem Produkt gekennzeichnet oder in der Dokumentation enthalten sind.

WARNING
AVERTISSEMENT
L'installation doit être effectuée exclusivement par un personnel qualifié. Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.

WARNING
ADVERTENCIA
Sólo el personal de servicio calificado podrá realizar la instalación. Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.

WARNING
AVISO
Apenas profissionais de atendimento técnico qualificados devem realizar a instalação. Leia e siga todos os avisos e instruções destacados no produto ou que façam parte da documentação.

WARNING
AVVISO
L'installazione deve essere eseguita esclusivamente da personale qualificato. Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.

Overcurrent warning statement

WARNING
The Secure Router 4134 relies on the building installation for overcurrent protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10 A international) is used on the phase conductors.

WARNING
WARNUNG
Nur qualifiziertes Wartungspersonal darf die Installation vornehmen. Lesen und befolgen Sie die Warnungshinweise und Anweisungen, die auf dem Produkt gekennzeichnet oder in der Dokumentation enthalten sind.

WARNING
AVISO
Apenas profissionais de atendimento técnico qualificados devem realizar a instalação. Leia e siga todos os avisos e instruções destacados no produto ou que façam parte da documentação.

WARNING
AVERTISSEMENT
L'installation doit être effectuée exclusivement par un personnel qualifié. Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.

WARNING
ADVERTENCIA
Sólo el personal de servicio calificado podrá realizar la instalación. Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.

WARNING
AVISO
Apenas profissionais de atendimento técnico qualificados devem realizar a instalação. Leia e siga todos os avisos e instruções destacados no produto ou que façam parte da documentação.

WARNING
AVVISO
L'installazione deve essere eseguita esclusivamente da personale qualificato. Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.

Cover plate warning statement

CAUTION
If you do not install a module in a slot, keep the metal cover plate in place over the slot. Removing the cover plate impedes airflow and proper cooling of the unit.

CAUTION
ACHTUNG
Wenn Sie in kein Modul in diesem Steckplatz installieren, stellen Sie sicher, dass sich die Abdeckplatte aus Metall weiterhin über dem Steckplatz befindet. Wenn die Metallplatte entfernt wird, behindert dies den Luftstrom und eine angemessene Kühlung der Einheit.

CAUTION
ATTENTION
Si vous n'installez pas de module dans le connecteur, veillez à laisser le panneau de protection métallique en place sur le connecteur. Le retrait du panneau de protection entrave la circulation de l'air et empêche un refroidissement correct de l'unité.

CAUTION
PRECAUCIÓN
Si no instala un módulo en la ranura, asegúrese de mantener la placa de cubierta de metal en su lugar sobre la ranura. Quitar la placa de cubierta impide la circulación de aire y el enfriamiento adecuado de la unidad.

CAUTION
CUIDADO
Caso você não vá instalar um módulo no slot, mantenha a tampa de metal no lugar. A remoção da tampa impede correntes de ar e o resfriamento adequado à unidade.

CAUTION
ATTENZIONE
Se nello slot non viene installato un modulo, accertarsi di mantenere la copertura in metallo posizionata sullo slot. La rimozione della copertura in metallo ostruisce il flusso d'aria e il raffreddamento appropriato dell'unità.

Power cord warning statement

DANGER
Use only power cords that have a grounding path. Without a proper ground, a person who touches the switch is in danger of receiving an electrical shock. Lack of a grounding path to the switch may result in excessive emissions.

DANGER
GEFAHR
Verwenden Sie nur Netzkabel mit Erdungspfad. Ohne einen angemessenen Untergrund besteht für die Person, die den Schalter berührt, die Gefahr eines Stromschlags. Das Fehlen eines Erdungspfads beim Schalter führt möglicherweise zu überhöhten Emissionen.

DANGER
DANGER
Utilisez uniquement des cordons d'alimentation possédant un conducteur de terre. En l'absence d'un conducteur de terre, une personne touchant le commutateur pourrait recevoir un choc électrique. L'absence de conducteur de terre au commutateur peut provoquer des émissions excessives.

DANGER
PELIGRO
Utilice sólo cables de corriente que tengan puesta a tierra. Sin una puesta a tierra adecuada, una persona que tocara el interruptor estaría en peligro de recibir una descarga eléctrica. La falta de una puesta a tierra en el interruptor podría causar emisiones excesivas.

DANGER
PERIGO
Use apenas cabos de alimentação que tenham ligação à terra. Sem um aterramento adequado, uma pessoa que toque no switch corre o risco de receber um choque elétrico. A ausência de aterramento para o switch pode resultar em excesso de emissões.

DANGER
PERICOLO
Utilizzare esclusivamente cavi di alimentazione dotati di un percorso per il collegamento a terra. Senza un appropriato sistema di messa a terra, le persone che vengono a contatto con l'interruttore corrono il rischio di ricevere scosse elettriche. L'assenza di un percorso per il collegamento a terra dell'interruttore può causare un eccesso di emissioni.

Nortel Secure Router 4134

Installation — Hardware Components

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ATTENTION: Before unpacking, installing, or using the Secure Router 4134, ensure you read the section about regulatory information and general safety precautions in the first chapter of this guide.

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